

Undercover and Collective Interviewing to Detect Deception

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"In a time of universal deceit, telling the truth is a revolutionary act."

George Orwell

Abstract

This thesis aims to examine whether undercover and collective interviewing can elicit cues to deceit. Undercover interviewing is when the suspect is not explicitly informed that they are being interviewed, and collective interviewing involves one interviewer interviewing multiple suspects. In Chapter 1, the thesis is introduced. Then Experiment 1 is described in which participants were covertly interviewed about their plans for an upcoming trip. Findings indicate significant verbal differences in truth tellers' and liars' responses.

Experiment 2 is a lie detection study, which is carried out in order to determine whether these differences could be identified by lay observers. Observers were given transcripts of undercover interviews from Experiment 1. They could correctly determine veracity significantly better than chance level.

Experiment 3 examines another short undercover interview. Participants were despatched on a mission to take photographs, with truth tellers aiming to promote the square to visitors and liars surveying the area for a place to plant a decoy device. When they finished taking photographs, each participant was approached by a mime artist who asked them if they had photographed him and if he could see the photos. Results showed that truth tellers were more likely than liars to admit to having photographed him, and to allow him to see the photos. When analysing the photos, truth tellers' photographs were more open, appealing, included more people, and central than liars' photographs. Suspicious features were more prominent in liars' photos and liars mentioned them more frequently.

The collective interviewing manipulation is tested in Experiment 4a, in which suspects were interviewed in pairs about their recent activities. Pairs of truth tellers went to lunch in a nearby restaurant, whereas pairs of liars 'stole' money from a purse in an office and were asked to use the truth tellers' activities as an alibi. Results showed that liars looked at the interview more, and exhibited less gaze aversion than truth tellers. More liars than truth tellers developed a strategy prior

to the interview.

In Experiment 4b, the data from Experiment 4a is analysed to assess the verbal behaviour of the suspects when being interviewed collectively. Truth tellers interrupted each other more, corrected each other more, and added more information to each other's accounts than liars.

Experiment 5 is a combination study involving undercover and collective interviewing. Participants undertook a mission in pairs, where they photographed an animal enclosure in a park. Truth tellers did this to collect material for a promotional flyer, whereas liars acted as animal rights activists. Participants were interviewed covertly and formally in pairs. Results showed that liars had less overlap than truth tellers when their responses in the covert interview were compared to their responses in the formal interview. Liars were also less likely than truth tellers to mention the undercover interviewer in the formal interview.

Chapter 8 is the General Discussion. Findings are summarised, and implications, future research and limitations are discussed. The overall conclusion is that undercover interviewing and collective interviewing elicit observable cues to deceit.

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Appendix 2 Jundi, S., Vrij, A., Hope, L., Mann, S., Hillman, J. (2013). Establishing Evidence through Undercover and Collective Intelligence Interviewing. *Psychology, Public Policy and Law*

Declaration

Whilst registered for the above degree, I have not been registered for any other research award. The results and conclusions embodied in this thesis are the work of the named candidate and have not been submitted for any other academic award.

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Dissemination

Articles

- Jundi, S., Vrij, A., Hope, L., Mann, S., Hillman, J. (2013). Establishing Evidence through Undercover and Collective Intelligence Interviewing. *Psychology, Public Policy and Law*
- Jundi, S., Vrij, A., Hope, L., Mann, S., Hillman, J., Warmelink, L., & Gahr, E. (2013). Who should I look at? Eye contact during collective interviewing as a cue to deceit. *Psychology, Crime and Law*
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- Warmelink, L., Vrij, A., Mann, S., Jundi, S., & Granhag, P. (2012). The effect of question expectedness and experience on lying about intentions. *Acta Psychologica* 141 (2) 178-183.
- Vrij, A., Jundi, S., Hope, L., Hillman, J., Gahr, E., Leal, S., Warmelink, L., Mann, S., Vernham, Z. & Granhag, P. (2012) Collective interviewing of suspects. *Journal of Applied Research in Memory and Cognition*, 1(1) 41-44
- Vrij, A., Mann, S., Jundi, S., Hope, L. & Leal, S. (2012). Can I take your picture? Undercover interviewing to detect deception. *Psychology, Public Policy and Law* 18(2), 231-244

Conference Presentations

- Jundi, S., Vrij, A., Mann, S. Hope, L. (July 2013) 'Establishing evidence to detect deception'. Paper presented at the International Investigative Interviewing Research Group, Maastricht, The Netherlands
- *Symposium Chair* (April 2012): Detecting Deception, European Association of Psychology and Law, Nicosia, Cyprus.
- Jundi, S., Vrij, A., Mann, S. Hope, L. (April 2012) '*How asking for potentially incriminating information can help with detecting deception*'. Paper presented at the European Association of Psychology and Law, Nicosia, Cyprus.
- Jundi, S., Vrij, A., Mann, S. Hope, L. (March 2012) '*Using inconsistency to detect deception*'. Paper presented at the American Psychology and Law Society conference, Puerto Rico, USA.
- Jundi, S., Vrij, A., Mann, S. Hope, L. (December 2011) '*Street-wise interviewing to detect deception*'. Paper presented at the International Centre For Research in Forensic Psychology conference, Portsmouth.
- Jundi, S., Vrij, A., Mann, S. Hope, L. (August 2011) '*Street-wise interviewing to detect deception*'. Paper presented at the Postgraduate Conference on Deception, Lancaster, UK.
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Part I: Introduction

Chapter 1: Introduction to Thesis

Introduction

Detecting lies is a skill many people would like to possess, both in everyday life and in forensic settings. However people in general do not tend to perform significantly over chance when attempting to classify truths and lies. This can prove catastrophic in forensic situations, when lives can depend on an official correctly determining veracity. If a guilty person is believed to be innocent, they may be released back into the public where they will have the opportunity to reoffend. Equally grave are situations in which innocent people are believed to be guilty and subjected to lengthy and costly court proceedings that may have severe detrimental effects on all areas of their life. An ideal situation would be one in which innocent suspects were correctly pardoned and guilty people correctly tried in 100% of cases. For this to occur, a more reliable method of determining veracity needs to be developed. This thesis aims to develop such methods and identify interviewing techniques that can successfully elicit cues to deceit.

Suspects' accounts are primarily delivered through interviews. Therefore eliciting cues to deceit may be achieved through particular interviewing techniques. Examples of these cues are verbal differences between truth tellers and liars, which can manifest themselves in the actual speech content e.g. the stories of liars 'made less sense, and they told these stories in less engaging and less immediate ways' . DePaulo et al.'s (2003) meta-analysis also found that liars sound more uncertain and have a higher voice pitch than truth tellers. Other cues that can be indicative of deceit are speech hesitations i.e. frequency of saying 'ah' or 'mm' between words, confirmations i.e. saying 'yes' or 'yeah' to confirm what they are saying, and hedges i.e. words such as 'maybe' and 'probably' to make statements less forceful or assertive . To date, these verbal cues have been examined in formal interview styles. Whether the observed patterns persist in non-formal interviews or interactions with suspects has not yet been explored, and thus will be addressed in this thesis.

For a more thorough examination of suspect behaviour, non verbal cues can be inspected. Indeed non verbal cues have been found to provide cues to deceit (e.g. Vrij, 2008). For example eye contact is a fundamental aspect of interaction and communication and is investigated as a nonverbal cue to deception. Both laypeople and professional lie detectors tend to expect liars to exhibit gaze aversion i.e. look away from the interviewer (Vrij, 2004, 2008; Vrij, Akehurst & Knight, 2006). In actuality the opposite may be true; liars may want to monitor the investigator's reactions in order to determine whether they appear to be being believed. Also because of the widely held concept that liars tend to avoid eye contact, they may believe that maintaining eye contact will increase their credibility. Eye contact is not only a factor in one to one encounters – it plays a part in the communication between members of all sizes of groups. Whether observed patterns of eye contact remain when groups of people are interviewed is a question that warrants investigation in this thesis.

Deception has been investigated in countless research settings but an observable failsafe method that can perfectly determine veracity is yet to be found. Therefore this thesis has built on previous factors as summarised above, but also investigated settings that have not yet been explored in lie detection. In particular, two such overarching factors were explored in depth; collective interviewing and undercover interviewing. The reasoning behind these selected paradigms are discussed below.

Collective Interviewing

Deception research involving forensic interview style settings typically focuses on individual truth tellers and liars. However criminals do not always act individually - people often commit crimes with others. This is a relatively unexplored gap in the research that could highlight effective techniques to correctly determine veracity in groups of suspects. Indeed when examining group psychology, it has been suggested that 'systems of morality spring out of social intercourse'

(Sprott, 1958, p.14). Examining communication within a group of suspects could therefore highlight differences between groups of truth tellers and groups of liars. Indeed there are instances in which suspects are questioned in groups e.g. before arrest, at road border controls etc.

It may be possible that deception detection is facilitated when interviewing groups of suspects, as the members of the group will have to rely on each other to maintain a consistent story, stick to any strategies formed, not contradict each other etc. Moreno (1953) observed that groups consist of a 'preference structure' i.e. an amalgamation of likes, dislikes and indifferences which link all of its members. When lying, groups must incorporate these complexities of the group interaction into what is already a cognitively demanding task. Groups of liars are therefore likely to have different strategies to individual liars. This pattern of different strategies has been found in previous research where pairs of liars have given thought to planning and discussing their fabricated story with each other so they "get their stories straight".

Undercover Interviewing

Deception research typically uses formal forensic interview styles (e.g. similar to those conducted on suspects in police stations). These types of interviews often rely on the anxiety of the interviewees in order to determine veracity. The assumption is that liars are more anxious during interviews than truth tellers and will therefore show stronger cues of anxiety, such as heightened physical arousal, increased movements, and gaze aversion. However, truth tellers may also show signs of anxiety when they are interviewed, possibly due to being accused of misconduct or out of fear of not being believed. This may negate any differences in anxiety between truth tellers and liars. As a consequence, interview techniques that rely on signs of anxiety may not be very effective in detecting deceit.

A possible way to avoid relying on anxiety is to conduct interviews without the suspect

actually knowing they are being interviewed i.e. covert or undercover interviewing. To our knowledge, lie detection via undercover interviewing has not been examined to date and so may add a vital theoretical and applied dimension to the field.

Outline of the thesis

This thesis examines verbal and nonverbal cues to deception, in individuals and in groups of participants, and in formal interviewing settings as well as street interviews with undercover interviewers. Investigation was undertaken into how these manipulations affect truth tellers and liars, and the cues to deceit and honesty that they exhibited. As significant differences in speech and behaviour were found in the studies conducted within the thesis, a lie detection study was carried out where random samples of lay people were asked to try and detect the liars (see Vrij, 2000, 2002, for reviews). This was to determine whether the interview strategies in the study was effective in eliciting observable cues to deceit, indicated by the investigator correctly determining veracity significantly over chance level (50%).

General Methodology

The majority of the data were collated through interviews. The format of these interviews varied from impromptu 'street' interviews to formal police-style interviews. Liars were asked to use the truth tellers' task as an alibi across all studies. This was done so any differences in verbal and non verbal behaviour could realistically be attributed to veracity, rather than due to suspects describing different tasks. For example in one study truth tellers were actual tourists about to visit an island. Liars were told their task was to outline an ideal location to plant a bomb, but if questioned to claim that they were a tourist visiting the island.

During interviews, a strategic-questioning approach has been found to elicit differences between the behaviour of liars and truth tellers. This focuses primarily on the premise that liars formulate strategies to prepare themselves for being interviewed. However this planning involves

anticipating the questions that will be asked, and so asking unanticipated questions will negate the merits of planning. Asking liars questions they have not anticipated elicits effective cues to deceit, with raters being able to judge the veracity of 80% of participants correctly. So this method was employed in the current research, with tactics such as spatial questions and repeated questions being used. Interviewees in the past have confirmed that these forms of questions came as a surprise.

To extend our examination of verbal cues to deceit, aspects of speech such as hedges, filler phonemes and confirmations were analysed. In addition, criteria belonging to Criteria-Based Content Analysis (CBCA) (Raskin & Esplin, 1991) and Reality Monitoring (RM) (Masip, Sporer, Garrido & Herrero, 2005) were used to analyse suspect interviews in this thesis. Non verbal cues (gaze aversion and ‘deliberate eye contact’) and other verbal cues such as interruptions, corrections and additions were coded in terms of frequency of occurrence or on Likert scales. As this is a subjective form of analysis, multiple raters coded the same variable and their results were compared using Inter Correlation Coefficients (ICCs) to ensure significant consistency.

Strategies

Strategies of truth tellers and liars when undertaking interviews are an important but under-researched area. Current lie detection research has promoted interviewing styles that can exploit the different mental states of truth tellers and liars (Vrij & Granhag, 2012; Vrij, Granhag, & Porter, 2010). To be effective in designing such interview protocols, it may benefit researchers to know more about these mental states. One way to gain further insight into the minds of liars and truth tellers is to ask them about their strategies.

Throughout the thesis the following methodology was adopted: Participants were given pre and post interview questionnaires asking them questions such as whether they have formulated a strategy, what questions were anticipated or unanticipated, and how confident they are that the

interviewer believed them. The majority of these were in the form of a Likert scale. Qualitative data such as strategies discussed was cluster coded in terms of similarity, so for example strategies to 'improvise' and those to 'just react' were given the same code. Again as this involves a degree of subjectivity, reliability coding was carried out by another rater and the results compared to ensure reliability.

Timelines

In addition to being verbally questioned, in one study participants were asked to recall events by writing and sketching illustrations on a timeline; a technique developed by Hope, Mullis and Gabbert (2013). An advantage of this is it may act as a memory aid to help ensure truth tellers recall information accurately, which may consequently elicit greater differences to liars who are largely not reporting factual occurrences. Another advantage of asking them to write and draw their activities is that it involves virtually no input from the interviewer and is therefore less likely to be affected by an interviewer's behaviour or actions. It will relieve any social pressure that participants may feel compels them to try and impress the experimenter (Jobe & Herrmann, 1996).

Ethics

All proposals for research were submitted for approval to the Psychology Research Ethics Committee. They inspected the methodology to be used and issued favourable opinions. Their contact details were included on all debriefing forms which were given to subjects on conclusion of their participation. In addition, 'Informed Consent Forms' were given to participants to sign prior to the experiment commencing. This outlined the procedure, the fact that they were free to withdraw at any time, that they could obtain the findings to the study and how the data would be kept and used. The data will be kept for a period of at least five years, in accordance with the Data Protection Act 1998. Participants were all given numbers so their names are not associated with the data.

The Experiments

The following is a summary of the design of each of the experiments. Each experiment adopts undercover interviewing, collective interviewing of suspects, or a combination of both to test the capacity of the interview format to elicit cues to deceit.

Experiment 1: ‘Can I take your picture?’ Examining how truth tellers and liars respond to undercover interviewing

Experiment 1 focussed on interviewing participants on the street through use of an undercover interviewer. Truth tellers ($N = 40$) were tourists in the hovercraft terminal about to visit the island. Liars ($N = 40$) were given a mission to travel to the island and were briefed to survey the surroundings to identify a suitable place to hide a bomb. They were told that if questioned to claim that they were going for a day out on the island, but were not explicitly told they would be interviewed whilst on the mission.

Liars were intercepted by the interviewer whilst waiting to enter the hovercraft terminal. The undercover lie detection interview was conducted by an appropriately dressed confederate posing as a student collecting information for a Tourism research project. The interview involved questions about their plans on the island, the timings of travel and whether they could mark their destination on a blank map of the island. The interviewer asked some spatial questions as liars tend to be unprepared for these questions (Vrij et al., 2009). We therefore predicted that liars would be less accurate in indicating their destination on a map. As truth tellers are likely to be less wary with an undercover interview, we predicted that this would manifest itself through differences in speech patterns between the liars and truth tellers.

Experiment 2: ‘Can you spot a liar?’ Investigating the ability of lay people to correctly determine veracity

Experiment 2 investigated whether the interviews from Experiment 1 elicited observable differences between truth tellers and liars. A total of 66 participants were given transcripts of interviews from Study 1a and asked to determine whether they were lying or telling the truth, how confident they were in this decision, and the reason for their decision. Each participant was given 8 transcripts consisting of 4 liars and 4 truth tellers, the order of which was counterbalanced. Identifying significantly more than 50% of transcripts correctly indicates a detection ability above chance level, suggesting that the interviewing tactics used were able to successfully elicit differences between truth tellers and liars.

Experiment 3: ‘I’m a photographer, not a terrorist’ The use of photography to detect deception

Experiment 3 examined whether liars are less likely than truth tellers to share potentially incriminating information when interviewed by an undercover interviewer. Previous research suggests that liars distance themselves from potentially incriminating evidence opting instead for an ‘avoid and escape’ strategy (Granhag & Hartwig, 2008).

All participants conducted ‘campaigns’ involving photographing a square near the university, featuring a large television screen. Truth tellers (N = 41) were told that the photographs would be used to create a flyer encouraging people to visit the square to view the Olympics. Liars (N = 39) were told the aim to identify suitable areas to place a decoy device to cause a disturbance whilst the Olympics were shown.

In the square was a stooge mime artist who interacted with the participant by play imitation to make them feel more conspicuous. As participants were about to leave the square, the mime artist approached them. He asked if they had photographed him and if so if he could see the photograph. After they left he noted their responses.

We made several predictions, including more truth tellers than liars would agree to let the mime artist see the photos. This supports the theory that liars try to disassociate themselves from

potentially incriminating evidence. Participants were asked about their strategies in a questionnaire.

Experiment 4: ‘Who should I look at?’: Verbal and non verbal differences between truth tellers and liars when interviewing the suspects collectively

Experiment 4 focussed on collective interviewing i.e. interviewing suspects in pairs. Truth tellers (20 pairs) were taken to a nearby shopping complex to have lunch in a restaurant. Liars (20 pairs) were asked to ‘steal’ £10 from a purse in an office. All participants were told that they were suspected of having stolen £10, and would be interviewed about their recent activities in which they needed to convince the interviewer that they did not steal the money. Liars were asked to use the alibi of having been in a restaurant for lunch. Questions were general, spatial and temporal, and some were designed to come as a surprise to participants. Interaction between pairs as well as with the interviewer was examined, both verbally and in terms of eye contact. Participants were given time to prepare together and were asked about their strategies in a questionnaire. Amongst other aspects, we predicted that when compared to truth tellers, liars would make more eye contact with the interviewer to assess whether they were being believed, and therefore would also make less eye contact with each other.

Experiment 5: ‘Erm, what did I tell the other guy?’: Using undercover interviewing to establish evidence for a formal interview

Experiment 5 combined undercover and collective interviewing. Each pair was given a ‘mission’ to complete. For truth tellers (25 pairs) this involved taking photos for a ‘Visit Victoria Park’ campaign, and liars (25 pairs) took photos for an animal rights campaign. Truth tellers and liars were given different routes to take and liars were asked to pretend that they are working on a ‘Visit Victoria Park’ campaign if questioned.

Pairs were not explicitly told that they would be interviewed whilst on the mission. They were intercepted whilst in the park by an undercover interviewer posing as a member of the

council who was conducting a survey on park usage. To make this more believable a stooge was employed, who the interviewer appeared to be questioning as the pair approached.

When they returned to the department, all participants were told that they were suspected of having worked on an animal rights campaign and that they needed to convince the interviewer they were working on a 'Visit Victoria Park' campaign. Liars were told about the truth tellers' mission and the routes they took and were instructed to use this as an alibi in their interview. Participants were all given time to prepare together and were asked about their strategies in a questionnaire. They then completed a formal interview in pairs, which asked about their activities and the routes they had travelled on. They were also asked to mark their activities on a timeline. Based on theoretical principles we predict amongst other aspects that liars would be less forthcoming about their meeting with the undercover interviewer and would show less overlap in their answers in the undercover and formal interviews.

Part II Undercover Interviewing to Detect Deception

Chapter 2: Experiment 1 ‘Can I take your Picture?’

Abstract

There are many contexts in which investigators wish to interview suspects about their intentions without alerting the suspects that they are actually being interviewed. In the present experiment we developed and tested an ‘undercover interviewing’ technique. Liars were instructed to run a reconnaissance mission to a nearby island for planting a decoy device and were further instructed to plan an innocent cover-up story to hide their criminal intentions. On arrival at the hovercraft terminal an undercover agent, acting in the role of either a doctoral student or an amateur photographer, approached the liars and asked apparently innocuous questions about their forthcoming trip. Actual tourists using the hovercraft terminal served as a control group. The questions were designed in the knowledge that liars tend to avoid and escape, and do not expect spatial questions; and that truth tellers have detailed representations of intentions they are about to execute. In support of the hypotheses, liars were less willing to be photographed, less accurate in identifying the places they planned to visit, and less concrete and more uncertain when describing their intentions.

Introduction

Investigators usually attempt to detect deceit in formal interviews, and suspects are probably aware that one of the aims of such interviews is to judge their veracity. This awareness may hamper lie detection. Most lie detection techniques used to date are anxiety based (Vrij, 2008a; Vrij, Granhag, Mann, & Leal, 2011). The assumption of such techniques is that liars, due to their fear of apprehension, are more anxious during interviews than truth tellers and will therefore display more or stronger cues of anxiety, such as heightened physical arousal, increased movements, and gaze aversion (Vrij, Granhag, & Porter, 2010; Warmelink, Vrij, Mann, Leal, Forrester, & Fisher, 2011). However, truth tellers may also show signs of anxiety when they are interviewed, from being suspected of wrongdoing or out of fear of not being believed (DePaulo et al., 2003; Vrij, Mann, & Fisher, 2006). Even truth tellers' speech content can be affected during formal interviews, as they may neglect to mention details that they would otherwise have included outside the pressurised environment of a formal interview. Thus, in some instances, because truth tellers may also be anxious, this may actually negate any differences in anxiety between truth tellers and liars. As a consequence, lie detection tools that rely on signs of anxiety may not be very effective.

A possible solution is to conduct interviews without the suspect actually knowing they are being interviewed. We call this *undercover interviewing*. To our knowledge, lie detection via undercover interviewing has not been examined to date. Although undercover interviewing is perhaps not suitable for all situations, it may fit particularly well in determining the veracity of an individual's intentions. At the intentions stage, no crime has yet been committed, and a formal interview may therefore be inappropriate. In addition, in some investigative contexts, law enforcement and security personnel may have good reason to extract information from a suspect without he or she actually being aware that they are under investigation.

In the present experiment the participants were interviewed by an 'undercover agent', acting either as a doctoral student or an amateur photographer. He approached either tourists (truth tellers) or participants who were on a reconnaissance mission (liars) at a hovercraft terminal, and asked them

questions about their forthcoming trip to a nearby island. The requirement to maintain an undercover persona determines the questions that can be asked, and has several disadvantages and advantages in terms of lie detection. Starting with the disadvantages, interview tools that have shown to facilitate lie detection, such as discussing evidence (“Show me your ticket?”, e.g., Granhag & Hartwig, 2008; Granhag, Strömwall, & Hartwig, 2007), or imposing cognitive load on interviewees (“Please tell me how you went from your home to the hovercraft terminal but do that in reverse order so start from here and go back to your home?”, e.g., Vrij, Mann, Fisher, Leal, Milne, & Bull, 2008) cannot be employed without making the suspect suspicious about the questioner’s motives. For that reason, long and in-depth interview protocols are not possible either.

In terms of advantages, undercover interviewing creates the opportunity to ask questions that could be useful for lie detection purposes but which will not work in traditional overt interviews. For example, the undercover interviewer could invite suspects to engage in an apparently innocent activity that establishes their presence in a certain place at a certain time, such as asking whether the suspect would mind having a photograph taken that the interviewer could place on a website. Given that a plausible rationale for this request is provided (e.g. “I’ve just started a new business and I’m trying to build up my reputation as a photographer”) we can predict that truth tellers and liars will respond differently to this seemingly innocuous compliance request. Guilty people do not wish to be linked to their criminal activity and tend to ‘avoid and escape’ when asked about it (Granhag & Hartwig, 2008). This tendency to avoid and escape may result in greater reluctance to be photographed (Hypothesis 1).

Asking questions about a forthcoming trip is, in fact, asking about intentions. Lying about intentions has been neglected by deception researchers for a long time and research into this area has only recently emerged (Granhag & Knieps, in press; Vrij, Granhag, Mann, & Leal, in press; Vrij, Leal, Mann, & Granhag, 2011). However, much research on intentions has been conducted outside the deception context and that research is useful to predict differences between lying and truth telling about intentions (see Granhag, 2010, for a review of intention deception research). A finding that is particularly relevant to the present context is that an individual who is about to execute his/her

intention typically has a detailed mental representation of that intention (Trope & Liberman, 2003). This representation is more detailed than those of intentions the individual plans to execute at some later time (Trope & Liberman, 2003). It also differs from the mental representations of intentions that the person has not yet decided to execute (Ferguson & Bargh, 2004; Marsh, Hicks, & Bryan, 1999). Based on this, we predict that truth tellers will be more precise when describing their intentions (e.g., more references to exact timings; Hypothesis 2) and will express more certainty in what they are going to do than liars (i.e., fewer hedges; Hypothesis 3).

Of course, skilled liars may prepare a cover story about what they are going to do. In the present experiment liars were asked to say, if questioned, that they were visiting the island as a tourist and hence give some thought to their fictitious planned activities whilst there. Researchers have started to investigate how people prepare for their alibis (Colwell, Hiscock-Anisman, Memon, Woods, & Michlik, 2006; Hartwig, Granhag, & Strömwall, 2007; Hartwig, Granhag, Strömwall, & Doering, 2010; Strömwall, Hartwig, & Granhag, 2006). A popular strategy is to think of possible questions and prepare answers to those anticipated questions. People typically do not anticipate, and are thus unprepared for, spatial questions (Vrij et al., 2009). Therefore, such questions in particular should reveal deceit. In terms of visiting an island, it could be that liars identify which attractions they are supposedly going to visit (e.g., the castle) but do not check specifically where they are located. Therefore, liars should be less accurate than truth tellers in reporting exact locations of their alleged destinations on the island (Hypothesis 4).

In addition, a good alibi requires an understanding or anticipation of what truth tellers do in the same circumstances. This is a skill that many liars lack and is one of the reasons why the verbal lie detection tool Criteria Based Content Analysis (CBCA) often shows differences between truth tellers and liars (Vrij, 2005, 2008a). CBCA consists of 19 criteria including unusual details, spontaneous corrections and admitting lack of memory. In terms of preparing an alibi for a trip to an island, people with the least understanding will probably think of stereotypical tourist activities, such as visiting *tourist attractions*. Of course, tourists will visit such attractions, but they probably also carry out *other*

activities, such as going out for lunch, buying a souvenir or stopping to take photographs. We therefore predict that liars will report fewer activities than truth tellers (Hypothesis 5), although the two groups may not differ from each other in terms of mentioning tourist attractions.

We explored different undercover situations by manipulating the approach taken by the interviewer. In one situation the interviewer introduced himself as a doctoral student conducting research on tourism who was surveying travel plans for visiting the island (a well known tourist resort). In the other situation we examined a more covert undercover approach where the interviewer introduced himself as an amateur photographer who was working on his portfolio. We did not expect this manipulation to influence the responses of truth tellers and liars, but found it relevant to explore in order to examine the conditions under which passers-by would still be willing to answer questions. However, it meant that not all questions could be asked in the more covert condition. For example, while it is appropriate for a survey on tourism and travel to ask “When are you planning to come back?”, such a question cannot be asked by an amateur photographer without raising some suspicion.

Method

Participants

A total of 90 participants took part, 37% were male and 63% were female. Their average age was $M = 36.80$ ($SD = 14.1$) years. No difference in gender emerged between truth tellers and liars, $F(1, 76) = .53$, *ns*, but liars were somewhat younger ($M = 33.84$, $SD = 13.9$) than truth tellers ($M = 40.24$, $SD = 13.67$), $F(1, 76) = 4.95$, $p < .05$. Although there is no theoretical reason why age would affect the findings predicted in the hypotheses, we re-ran the analyses presented in the main text with age as covariate. The same significant findings emerged as presented in the main text. Age is therefore not discussed further in this article.

Procedure

Liars were recruited via advertising posters and an announcement on a University website. The advertisements asked for volunteers to take part in a reconnaissance mission study lasting a maximum of 2 – 2.5 hours. It was also mentioned that participants would receive a £10 cash reward. The first 43

people that responded (consisting of university administrative staff, academic staff and students) acted as liars in the experiment. On arrival at the laboratory, the first experimenter gave participants the following briefing:

“You are a member of an anti-capitalist organisation that plans to disrupt the sea transport network for the June 2010 Isle of Wight music festival via a bomb hoax. It is your responsibility to determine where would be the most effective place to leave a decoy device that will cause alarm and ensure that hovercraft journeys will be cancelled. Your choices are at/around the hovercraft terminal at Southsea (located on UK mainland), on the hovercraft itself, or at/around the hovercraft terminal in Ryde (located on the Isle of Wight). In order to do this you will assess all three areas to discover which location would have the greatest disruptive impact. If anyone questions or suspects you, your cover story will be that you are visiting the Isle of Wight as a tourist. You will be given a tourist leaflet about the Isle of Wight so that you can prepare a convincing story. You will be given time now to examine this leaflet and devise a cover story as to why you are visiting the Isle of Wight. Remember it is in your interest to comply with anyone asking questions so as not to appear suspicious or defensive. You will be taken by an escort to the hovercraft terminal by bus from the department. You will arrive at the hover terminal where the escort will leave you with a pass for the hover that departs approximately 35 minutes after you arrive at the hover terminal. You therefore will have plenty of time then to start your investigation whilst looking at the terminal. You will be provided with a camera and Dictaphone. Gather as much information as you can about the number of people around, security (people and cameras), good hiding places, and so on, taking pictures and verbal notes on the Dictaphone. Remember not to arouse suspicion when using these items. Your journey of 10 minutes on the hovercraft will enable you to report on that as a possible site, and then you will have at least 5-10 minutes at the Ryde terminal to make notes and take photos whilst waiting for the next hovercraft to bring you back to Southsea. On your return to Southsea, the escort will meet you again to take you back to the department to report your findings to me. I will then give you a debrief and pay you £10 for your information.”

The participant was given some time to study the tourist leaflet (that contained information about tourist attractions and where they were located), to prepare a cover story and to ask questions. S/he was also given a camera and Dictaphone and the experimenter ensured that s/he knew how to use them.

The participant was then taken by bus to the hovercraft by the escort who said she would wait there for them to return on the next hovercraft. Soon after arrival at the hovercraft terminal the participant was approached by an undercover agent who asked them some questions (see below). All participants answered the questions. After the questioning, the participant was approached by a second experimenter who addressed them by name and explained that the experiment was over. They were then reunited with the escort who asked them to complete a questionnaire (see below) on the return bus journey to the department. After completing the questionnaire, the first experimenter debriefed the participant and gave him/her £10 cash.

Truth tellers were recruited at the hovercraft terminal. The undercover agent approached all people he believed to be tourists visiting the Isle of Wight. If they answered all the questions (all tourists did in the doctoral student condition and 95% did in the amateur photographer condition), they were included as participants in the experiment. After the interview the second experimenter approached the participants and told them that they had actually just participated in an experiment. If consent to continue participating was obtained (all participants gave consent), they were then asked to fill out a questionnaire and debriefed. All participants received a goody bag for their efforts and consent for use of their data.

Undercover Agent and Questions Asked. The undercover agent approached 46 participants (of whom 21 were liars) in the guise of a University doctoral student conducting a tourism and travel survey. In this condition he wore University I.D. and had questions on a clipboard. He approached the remaining 44 participants (of whom 22 were liars) in the guise of an amateur photographer. In this condition he was dressed casually with a camera around his neck and asked questions in a conversational style (he did not carry a clipboard in this condition). The interviews

were covertly audiotaped. To achieve this, the undercover agent secretly carried an audio recorder in his pocket, linked to a microphone disguised as in-ear headphones which were hanging around his neck and hence around chest level.

The undercover interviewer asked the participants: (i) What they were going to do on the Isle of Wight; (ii) How they would get from the hovercraft terminal to X (wherever the participant said they were going to); (iii) At what time they planned to catch the return hovercraft (only asked under the doctoral student cover); (iv) To point out on a map which locations they were going to visit (for this purpose the undercover agent showed them an unmarked/non-annotated map of the Isle of Wight and asked them to point out with a pen the locations they were going to visit); and (v) Whether they would mind having a photo taken that he could put up on his website. In case they gave permission, the interviewer pretended to take a picture, although no actual picture was taken. On average liars said more during the entire interviews ($M = 95.88$ words, $SD = 67.48$) than truth tellers ($M = 67.15$, $SD = 45.32$), $F(1, 88) = 5.71$, $p < .01$, $d = .51$), but all interviews were very short.

Although the undercover interviewer was aware who the liars and truth tellers were, he was blind to the purpose of the experiment and hypotheses. We return to this issue in the Discussion.

The Questionnaire. After the interview, the second experimenter asked participants to confirm their age and gender; the extent to which they felt motivated to give the undercover agent the information he asked for (on a 7-point Likert scale ranging from [1] not at all motivated to [7] very motivated); the extent to which they perceived the undercover agent as authoritative (on a 7-point Likert scale ranging from [1] not at all to [7] very authoritative); and the extent to which they were familiar with the Isle of Wight (on a 7-point Likert scale ranging from [1] I've never been to the island to [7] I've been there loads of times). The liars were further asked whether they thought that the interview with the undercover interviewer was part of the experiment (on a 7-point Likert scale ranging from [1] not at all to [7] yes I thought they were); and whether they were surprised that they did not actually go to the Isle of Wight (on a 7-point Likert scale from [1] I was very surprised to [7] I was not at all surprised).

Finally, the participants were shown all questions they had been asked during the interview and asked to indicate how odd they found that they had been asked each one during the interview (on 5-point Likert scales ranging from [1] not at all to [5] very).

The Debriefing. In the debriefing the participants were told that the interview had been covertly audiotaped and permission was sought to use the audiotapes for further analyses (all participants gave permission to use the interviews). They were also informed that the undercover agent had not actually taken their picture.

Coding

All interviews were transcribed and coded by two raters blind to the veracity status of the transcripts. The raters independently coded the number of hedges (e.g., utterances such as ‘likely’, ‘probably’, ‘I am not sure’, ‘maybe’ etc.) in participants’ responses; whether or not the participants mentioned a return time for the hovercraft (both an estimation ‘around 2 pm’ or an exact time ‘I’ll take the 6.45pm return hovercraft’ were coded as references to time or timings); whether the participant agreed to have his/her photograph taken; and the number of locations, tourist attractions (e.g., Flamingo Park’, ‘Blackgang Chine’, ‘Carisbrooke Castle’) and activities (e.g., ‘have a look around’, ‘walking’, ‘having lunch’, ‘taking photos’) the participant mentioned. The inter-rater reliability between the two raters was high and ranged from .64 (mentioning activities) to 1.00 (permission for photo to be taken). All disagreements were resolved in a discussion between the two raters and the final agreed scores are used in the analyses. For hedges, the scores were corrected for the number of spoken words and the mean scores presented in the text and table represent the number of hedges per 100 words. Finally, the accuracy of location identification was determined by calculating in millimetres the distance between the actual location of each site and the participant’s indication of where it was.

Results

Questionnaire

The majority of liars (70%) were surprised that they did not go to the Isle of Wight (score of

3 or lower on the 7-point Likert scale, $M = 2.67$, $SD = 2.0$), and 54% of the liars thought that the undercover questioning was part of the experiment (score of 5 or higher on the 7-point Likert scale, $M = 4.53$, $SD = 2.5$). The type of cover had no effect on this latter result, $F(1, 43) = .93$, *ns*. Also, whether or not the liars thought that the undercover questioning was part of the experiment did not affect their verbal responses during the undercover interview discussed in the hypotheses-testing section below (all F 's < 1.99 , all p 's $> .16$). The distinction between liars who thought and liars who did not think the undercover interviewing was part of the experiment is therefore not taken into account in further analyses.

Most participants (80%) said they were motivated to give the undercover agent the information he asked for (score of 5 or higher on a 7-point scale, $M = 5.62$, $SD = 1.6$), and Veracity or Type of Cover did not have an effect on this, all F 's < 2.35 , all p 's $> .13$. Finally, Veracity and Type of Cover did not affect whether participants found the interviewer authoritative ($M = 3.98$, $SD = 1.9$), all F 's < 1.62 , all p 's $> .20$), and the extent to which the participants were familiar with the Isle of Wight ($M = 3.84$, $SD = 2.0$), all F 's $< .48$, all p 's $> .49$).

To examine whether the experimental manipulations had an effect on how odd the participants thought the questions were, 2 (Veracity) X 2 (Type of Cover) ANOVAs were conducted. Veracity had an effect only on the return time question, $F(1, 43) = 6.48$, $p < .05$, $d = .78$), with liars finding the question more odd ($M = 2.61$, $SD = 1.2$) than truth tellers ($M = 1.68$, $SD = 1.2$). Type of Cover had an effect only on the question about what they are going to do on the Isle of Wight. This question was seen as significantly more odd in the amateur photographer condition ($M = 2.39$, $SD = 1.3$) than in the doctoral student condition ($M = 1.44$, $SD = .9$), $F(1, 86) = 17.25$, $p < .01$, $d = .87$). None of the Veracity X Type of Cover interaction effects were significant, all F 's < 2.30 , all p 's $> .13$). Of the five questions asked, only the one about taking a photo was viewed as odd. The majority of participants (55%) found that question odd (scores of 4 or 5 on the 5 point Likert scale), whereas the other four questions were perceived as odd only by 14% to 25% of participants.

Hypotheses testing

Seven ANOVAs were carried out utilising a Veracity X Type of Cover between-subjects design. Two of the Type of Cover main effects were significant. In the doctoral student condition, the participants uttered more hedges ($M = 5.07$, $SD = 3.61$) than in the amateur photographer condition ($M = 3.17$, $SD = 3.38$), $F(1, 86) = 8.26$, $p < .01$, $d = .54$. In addition, participants listed fewer events in the doctoral student condition ($M = .44$, $SD = .62$) than in the amateur photographer condition ($M = .70$, $SD = .59$), $F(1, 86) = 4.03$, $p < .05$, $d = .43$. Type of Cover main effects are not relevant for this article, only the Veracity main effect and Veracity X Type of Cover interaction effects are of direct interest. None of the interaction effects were significant (all F 's < 3.84 , all p 's $> .05$) but five of the seven Veracity main effects were significant. Table 1 provides all the relevant information about the univariate Veracity effects.

The findings support all five hypotheses. Liars were less willing to be photographed (Hypothesis 1), and less likely to mention return times (Hypothesis 2). In addition, they uttered more hedges (Hypothesis 3), were less accurate when identifying locations they planned to visit on a map (Hypothesis 4) and mentioned fewer activities (Hypothesis 5). No differences were found between liars and truth tellers in the number of tourist attractions and locations they mentioned. Regarding Hypothesis 4 (identifying locations on the map), in real life it may be easier just to judge the accuracy of the first location that is pointed out. Truth tellers ($M = .26$, $SD = 1.60$) were more accurate than liars ($M = 18.83$, $SD = 43.74$) in pointing out the first location, $F(1, 75) = 8.60$, $p < .01$, $d = .82$.

Table 1. Participants' Responses as a Function of Veracity

	Truth		Lie		F	P	d
	M	SD	M	SD			
Probability of agreeing to have photo taken	.81	.40	.60	.49	4.61	<.05	.43
N exact times mentioned	.88	.34	.30	.47	22.20	< .01	1.43
Hedges uttered per 100 words	3.10	2.74	5.27	4.09	10.20	< .01	.63
N locations mentioned ⁱ	.94	.79	.67	.64	3.21	.08	.38
Distance (mm) between actual location and participant's indication of its location	2.00	7.76	19.61	43.17	7.46	< .01	.69
N tourist sites mentioned	.47	.58	.67	.64	2.28	.13	.33
N activities mentioned	.72	.90	.37	.54	5.06	< .05	.49

Discussion

To our knowledge, this is the first experiment discussing an undercover interviewing technique with the main aim of detecting deception. An undercover agent asked truth tellers (actual tourists) or liars (participants who were on a mission) five questions about their forthcoming trip to a local island/tourist destination. The questions were based on the knowledge within the wider deception literature that liars (i) have a tendency to avoid and escape, (ii) do not anticipate spatial questions, (iii) and often have poor imagination when preparing alibis; and that (iv) truth tellers have more detailed representations of intentions that they are about to execute. Many differences emerged between liars' and truth tellers' responses. Liars were less willing to be photographed, less accurate when pointing to the places they planned to visit on a map, less concrete and more uncertain when describing their intentions, and less likely to report activities that are not typical tourist activities ('go for a walk', 'have lunch'). What makes the results remarkable is that both truth tellers' and liars' answers were very short, on average less than 100 words were uttered in the entire interview. It thus appears that liars and truth tellers do not have to say much for verbal cues to deception to occur, as long as diagnostic questions are asked. A second remarkable aspect is that the liars were not naïve: They had prepared a cover-up story for their reconnaissance mission. This preparation was to some extent successful, as liars and truth tellers did not differ in the number of tourist attractions and locations they mentioned. Liars' downfall, however, was that many of our questions went beyond their planning.

We used two types of undercover scenario, the undercover agent took the role of a doctoral student researching tourism/travel trends or an amateur photographer. This did not affect the responses given by the participants. A crucial element of an undercover lie detection approach is that the suspect is unaware of the true purpose of the questions or that he or she is being monitored. In that respect two findings, both unrelated to the Type of Cover we used, are encouraging. First, the truth tellers and liars did not find most of the questions the undercover agent asked to be odd. Second, almost half of the liars were not aware that the undercover interview was part of the experiment. We believe that this is an encouraging percentage because participants in a psychology experiment are most likely to be on the alert and expect such things to happen. In fact, for that reason we had expected more liars to work out that the undercover interview was part of the experiment. The liars who were unaware told us in the debriefing session that they did not suspect the interviewer because they were focussing on their surveillance task. (In other words, they were truly unaware, rather than not reporting suspicion due to demand characteristics.) Furthermore, the majority of those who did realise that the undercover interview was part of the experiment said that their suspicions arose because they were told at briefing to come up with a cover-story. This suggests that in real life, when such briefings do not take place, a lack of awareness may be even higher than found in the present experiment. Although awareness about being interviewed can be harmful in real life (it may make the suspect alert that s/he is under observation) it is positive that this awareness did not affect the answers liars gave, as those who were aware that the questioning was part of the interview gave similar responses to those who were unaware.

An undercover agent can only be successful if the person s/he approaches is cooperative and willing to answer the questions. In our experiment nearly all tourists were cooperative, as were all liars. Since we used real tourists, the level of cooperation shown by them should reflect the level of cooperation that can be expected in real-life settings when using the types of cover employed in this experiment. However, in real life people who are on a reconnaissance mission may be less willing to answer questions than our liars were. Whether this is the case is a valuable question and merits attention in future research. Such research could draw upon the persuasion literature, which provides

insight into how to increase levels of cooperation and compliance during interactions between strangers. However, the willingness to cooperate was not the point we were investigating. We examined differences in responses between truth tellers and liars once they had already committed to cooperating with the undercover agent.

We would like to emphasise that our sole aim was to examine whether undercover interviewing works in terms of lie detection. It was not our aim to compare this type of interviewing with formal, overt interviewing but this could be the next line of research. It would then be particularly interesting to compare truth tellers and liars in terms of displaying signs of anxiety. Based on what we discussed in the Introduction, we hypothesise that signs of anxiety are more diagnostic cues to deceit in undercover interviews than in formal interviews as truth tellers have less reason to be anxious in undercover interviews than in formal interviews. Of course, support of this hypothesis would suit law enforcement personnel well in their efforts to detect deception during undercover interviews as they overwhelmingly believe that liars display signs of anxiety (Strömwall, Granhag, & Hartwig, 2004).

We conclude this chapter with three comments. The first comment relates to our decision to recruit real tourists as truth tellers rather than instructing participants to pretend to be tourists. The reason for using real tourists is that it provides insight into how tourists will respond in real life. Although using tourists may have drawbacks (we will discuss two), we believe that these do not outweigh this realism argument. The demographics of the tourists and the recruited participants in the lie condition may be different. In an attempt to avoid this, we did not just recruit students in the lie condition, but also other University personnel. Despite this, tourists were somewhat older ($M = 40.24$) than liars ($M = 33.84$). A difference in demographics between conditions becomes relevant if a theoretical explanation could be given as to why it should affect the participants' responses to the questions asked in the interview (e.g., why should age affect the responses?). We cannot think of any such explanation. Therefore, unsurprisingly, controlling for age differences did not affect the findings presented in the Results section. In addition, the undercover agent knew which participants were telling the truth and which were lying. We are aware that an interviewer's knowledge could affect participants'

responses (Snyder, Tanke, & Berscheid, 1977). However, the undercover interviewer was blind to the hypotheses and unaware of deception research. In other words, his knowledge was restricted and in our opinion too limited to yield an effect on the participants' responses.

The second comment is related to the choice of liars. We acknowledge that the people who make reconnaissance missions in real life may differ from the people who acted as liars in our experiment. They may be better skilled in carrying out reconnaissance activities such as finding suitable locations where to install bombs than our liars, but that was not the topic of our investigation. In terms of the ecological validity of the present experiment, the relevant question is whether they would give different responses in undercover interviews than our liars. We cannot think of a convincing theoretical explanation why they would.

Our final comment is related to whether undercover interviews are or will be carried out. We neither know this nor will discover it, due to the secretive nature of such interviews. However, not much imagination is needed to think of relevant investigative settings for such interviews.

ⁱ The number of locations appear somewhat low as many people mentioned an event without mentioning its location (e.g., Flamingo Park').

Chapter 3: Experiment 2 ‘Can you spot a liar?’

Abstract

Interviewing techniques in forensic settings are often deployed with a primary aim being to determine whether the interviewer is giving an honest or deceptive account. In order for the techniques to be effective, the cues to deceit that they elicit must be apparent to the interviewer or observers. This study investigated whether cues to deceit elicited by an undercover interviewing technique were apparent to lay observers with no formal lie detection training. Results showed that when viewing the transcripts observers could correctly determine veracity at a rate significantly over chance, with a truth bias present.

Introduction

Law enforcement officers are regularly required to assess whether someone is lying or telling the truth. Veracity judgements can be made several times in relation to the same suspect, from the point when a police officer decides to arrest them or not, to when an investigating officer interviews them, to when a judge and jury hear their testimony in court. If misjudged, consequences could be catastrophic, such as terrorists smuggling in explosive devices if they fool border control officials. In instances such as these, determining the suspects’ intentions regarding future events is crucial. Their answers could either be truthful (indicating true intent) or deceptive (indicating false intent). A great deal of deception research focuses on identifying whether people are truthful about past actions. This study therefore focussed on identifying deceptive statements about intentions.

Although an integral part of their job, the evidence from laboratory studies suggests that most professional lie catchers are not much better than laypeople at distinguishing truths from lies (e.g. (e.g., DePaulo & Pfiefer, 1986, Garrido & Mausip, 1999). Devising a paradigm of interviewing that increases the accuracy with which people can identify lies is therefore highly desirable for legal settings. Indeed if laypeople can successfully identify deceit in the interviews, professional law enforcement officers should effectively catch the liars too.

The study ‘Can I take your picture?’ (Vrij, Mann, Jundi, Hope & Leal, 2012) endeavoured to devise an interviewing technique of this nature that effectively elicits differences between truth tellers and liars. To assess whether this was successful, transcripts from the study were used to conduct a lie detection study. Participants were given transcripts and asked to judge whether the interview they read was that of a truthful or deceptive interviewee.

Given that judgements are based solely on the transcript, evaluators must rely on verbal cues to make their decisions. Several verbal lie detection tools have been designed to aid criminal investigators to distinguish between truths and lies. Two of these, Statement Validity Assessment (SVA) and Reality Monitoring (RM), are the most widely researched (Masip, Sporer, Garrido, & Herrero, 2005; Vrij, 2005, 2008). The core of SVA is Criteria-Based Content Analysis (CBCA), a list of 19 criteria that are thought to occur more often in truthful than in deceptive accounts (Köhnken & Steller, 1988; Steller & Köhnken, 1989; Undeutsch, 1984).

The RM and CBCA tools can distinguish truths from lies with about 70% accuracy (Vrij, 2008). A disadvantage of these methods is that people need to be trained to use them. In an ideal situation, investigators will not require training to identify deception. If a paradigm can be identified that successfully elicits differences between truth tellers and liars to an extent whereby untrained individuals can correctly determine veracity, the rate at which the veracity of suspects can be successfully delineated will in theory rise dramatically.

To test whether untrained investigators can detect deceit about intentions in undercover interviews, participants in this lie detection study were not told which cues to look for. From the Vrij et al. (2012) study, results showed liars were less willing to be photographed, less accurate in identifying the places they planned to visit, and less concrete and more uncertain when describing their intentions. The advantage of these results is that they pertain to behaviours that could in theory be

noticed by casual observers. Previous research (e.g. Vrij, Leal, Mann & Granhag, 2011) has demonstrated paradigms through which lay observers can accurately determine veracity, without the need for formal intensive training. We argue that the liars' speech in the Vrij et al. (2012) study can be correctly classified as deceptive without the need for any training, and this will be tested in the current study.

We therefore hypothesise that when reading a transcript, participants will be able to correctly identify whether it is from a truthful or deceptive interviewee at a rate significantly above chance level.

Method

A total of 66 participants, 51 of whom were female, were recruited. The mean age was 29.00 (SD = 13.96) years. Participants were given transcripts of undercover interviews conducted in the 'Can I take your picture' study. Each participant was given eight randomly selected transcripts (consisting of four from truthful interviewees and four from lying interviewees) and were entirely blind as to the veracity of the transcripts. In total, 93 different transcripts were used (49 of which were from truthful interviewees and 44 of which were from deceptive interviewees) and each transcript was viewed by more than one participant (an average of 5.68 participants per transcript), and the order in which the transcripts were presented was counterbalanced.

Participants were provided with the following information:

'In a study participants (both truth tellers and liars) were interviewed about their travel plans.

Truth tellers were tourists about to visit the Isle of Wight by hovercraft. They were approached by the interviewer who informed them he was studying a degree in Tourism. This interviewer then asked them a number of questions about their travel plans.

Liars were told that they would also be visiting the Isle of Wight, but that the purpose of their trip was to collect information for a future terrorist plot. They were briefed to prepare a cover story of being a tourist visiting the island in the event of being questioned by anyone. They were approached and questioned in the same way as truth tellers.

You are about to read transcripts of the interviews. After reading each transcript we would like you to indicate whether the person really was a tourist about to visit the island (truth tellers) or was pretending to be a tourist (liars).'

Participants were then asked to rate to what extent they were motivated to perform well on the task on a scale of 1 (not at all motivated) to 5 (very motivated) and were then given the eight transcripts. They judged whether these transcripts were truthful or deceptive. After they had completed this their results were analysed and the percentage of correctly judged transcripts for truthful and deceptive interviewees was calculated.

Results

Manipulation check

Participants had an average motivation score of $M = 3.98$ ($SD = 0.79$) on the 5-point motivation scale which means that they were highly motivated to appear convincing.

Hypothesis testing

Participants correctly identified truthful interviewees at a rate of 64.02% ($SD = 24.07$), which is over chance; $t(65) = 21.60$, $p < 0.001$. Deceptive interviewees were correctly identified at a rate of 56.82% ($SD = 25.40$) which is also above chance; $t(65) = 18.17$, $p < 0.001$; determined by a binomial test compared to 50% accuracy. There is a significant difference between the percentage rate at which truthful and deceptive interviewees were identified; $t(65) = 21.60$, $p < 0.001$.

In other words, participants classified truthful responses as truthful at a rate of 64.02%, and deceptive responses as truthful at a rate of 43.18%. So overall they rated 53.60% of all responses as truthful, which differs significantly from chance; $t(65) = 2.170$, $p = 0.034$.

Discussion

The accuracy rates obtained were higher than typically found in deception research (55%, see Bond & DePaulo, 2006; Vrij, 2008). There are two possible reasons for this. It could be that detecting true and false intent is easier than detecting truthful and deceptive recall of past activities, as has

been found in previous research (Vrij, Leal, Mann & Granhag, 2011). Alternatively or indeed potentially additionally, the covert interviewing paradigm used to interview suspects may manifest clearer differences between truth tellers and liars than the formal, forensic style interviews typically employed. With these covert interviews, suspects were not primed to expect them. Indeed 46% of the liars did not realise that the interview was part of the experiment. This could mean that the suspects were not as well prepared for the interview as they would be for an expected, formal forensic interview, and people are typically better liars if they have had the opportunity to prepare (DePaulo et al., 2003, Sporer & Schwandt, 2006, 2007; Vrij, 2008).

Furthermore, as interviewees were not aware it was an interview, they may not have tried as hard to convince the interviewer that they were telling the truth. So the preparation that liars had done may not have actually been executed, as they were unaware that the apparent BA Tourism student was actually making a judgement of their veracity.

Lying about intentions may also be more difficult than lying about the past, resulting in suspects being less convincing during their intentions interview. This complements the theory of Episodic Future Thought (EFT), which represents the ability to mentally pre-experience a one-time personal event that may occur in the future (Schacter & Addis, 2007). People with a plan for a future event that they intend to execute appear to activate a more detailed mental image of the upcoming occurrence than do those who adopt a plan that they do not intend to execute (Watanabe, 2005). This could therefore lead to liars struggling more to describe their image during an interview than truth tellers.

Although participants could determine veracity of both truth tellers and liars significantly above chance, they were more successful at correctly identifying truth tellers. Meissner & Kassin (2002) found an effect on response bias such that training and prior experience appeared to increase the likelihood of responding “deceit” as opposed to “truth.” However as our participants were all lay people who were untrained and inexperienced in deception detection, they did not have this

predisposition to respond with ‘deceit’ more so than ‘truth’, and were in fact significantly more likely to rate a response as truthful rather than deceptive. This is supported by previous lie detection studies which have found a ‘truth bias’ factor (Vrij & Baxter, 1999); where participants are more inclined to believe the interviewees and so judge more of them as being truthful.

This experiment tested the efficiency of covert interviewing of individual suspects in eliciting cues to false intent. However there are instances in which there may be only one interviewer but more than one suspect present. This is particular true in street interviews, as suspects may not be acting alone. In these situations covert interviewing could be used to approach suspects collectively in an effort to determine their intentions. Future research could involve a paradigm in which pairs of truthful and deceptive suspects are collectively interviewed covertly, and then transcripts of the interviews given to lay observers to assess whether veracity can be correctly ascertained.

Chapter 4: Experiment 3 ‘I’m a Photographer, not a Terrorist’

Abstract

The instance of police asking tourists to delete their photos as a precautionary counter-terrorist measure has attracted significant media attention. When planning large scale incidents or bombing campaigns, terrorists often conduct reconnaissance research to identify key targets. This may include taking photographs of potential target locations. Identifying an effective real-time method to distinguish between genuine photographers and those with more sinister intent may be beneficial for law enforcement and security agencies. Participants took photographs of their surroundings with genuine intent (truth tellers) or sinister intent (liars). After taking these photographs, the participants were approached by an undercover interviewer (a mime artist) who asked them whether he could see the photographs. Later, the participants discussed their photographs in a formal interview. Liars were less cooperative in their interaction with the undercover interviewer than truth tellers. In the formal interview, as the result of an ironic monitoring process, liars mentioned some security features that appeared in the photographs more than truth tellers. The findings suggest that photography and deception is a subject that could prove important to explore to benefit forensic and counter-terrorist practice.

Introduction

Terrorists carry out surveillance missions (Soufan, 2011) but it is unknown how often they use photography during those missions. The instance of police asking tourists in London to delete their photos as a precautionary counter-terrorist measure attracted significant media attention (Weaver & Dodd, 2009). Internet accounts suggest that this was not an isolated incident, with an online movement being formed to campaign for photographers’ rights entitled ‘I’m a Photographer, not a Terrorist!’. The issue is a global one, with a controversial terrorism prevention video being released in the USA asking the public to report photographers to the police (Terrorism Prevention Video asks Public to Report Photographers to Police, 2012).

Identifying an effective on-site method to distinguish between genuine photographers and those with more sinister intent could have multiple benefits. It could give innocent photographers a more secure platform to engage in legitimate activity without fear of being wrongly accused of criminal intent. Perhaps more importantly, it could provide law enforcement officers with the knowledge of how to approach photographers in a manner in which they could reliably determine whether the person could be involved in criminal activity. There are two main ways in which potential criminal intent could be initially gauged in this context: (i) how the photographer reacts to questioning, and (ii) the nature/content of the photographs themselves. We examined both features in the present experiment.

Being openly questioned by the police about the purpose of the photos could have disadvantages for both innocent people and potential criminals. It could induce panic or stress, but also, anger and resistance in innocent people (as discussions to date illustrate e.g. Weaver & Dodd, 2009; Laurent, 2009). It could make potential terrorists aware that they have been noticed, which could jeopardise an investigation into their network and activities. A potential way to avoid these disadvantages is to use undercover interviewers to approach the photographers, i.e. people who appear to be everyday civilians rather than law enforcement officers.

Undercover interviewing may fit particularly well in determining the veracity of an individual's intentions. At the intentions stage, no crime has yet been committed, and a formal interview may therefore be inappropriate. Indeed, there is evidence to show that undercover interviewing can elicit differences in responses between truth tellers and liars (Vrij, Mann, Jundi, Hope, & Leal, 2012).

The current study investigates undercover interviewing of photographers who are potentially involved in simulated terrorist activity. In the experiment, truth tellers took photographs to promote a city tourist location. Liars took photographs in order to plan planting a decoy device in the same tourist location and, as an alibi, photographs to promote the tourist location. The liars' mission included taking photographs of security features such as possible places to plant a decoy

device (bins, toilets, drains and manholes) and to check for security in the area and vantage points that they could be overlooked from (CCTV cameras, windows, rooftops). When the participants left the area after completing their mission they were approached in a non-threatening manner by a confederate posing as a street entertainer (a mime artist), who questioned them about their photographs. Later, participants had a formal interview about a selection of the photographs they took.

The introduction of the mime artist is a key manipulation in the study, designed to put liars in a situation that would make them feel more on the spot or conspicuous. The mime artist asked photographers if they have photographed him, and whether he could see the photos. Mentioning that they have taken photos of the mime artist will in all likelihood result in a conversation with the mime artist and liars may be reluctant to engage in such a conversation. They may wish to avoid possible questions the mime artist will ask or they may simply not be in a chatty and cooperative mood. Liars often experience more negative affect than truth tellers and this could make them more reluctant to engage in conversations (DePaulo et al., 2003; Mann, Vrij, Shaw, Leal, Ewens, Hillman, & Granhag, 2012; Vrij, Mann, Jundi, Hope, & Leal, 2012). The same reasons may also make liars reluctant to show photographs if asked. They may also engage in an 'avoid and escape' strategy where they distance themselves from anything or anyone they deem to be potentially incriminating (Granhag & Hartwig, 2008). In this case, it is a witness who may give evidence against them. We therefore predicted that liars would be less likely to report that they have photographed the mime artist (Hypothesis 1a) and more likely to refuse to show the mime artist their photographs than truth tellers (Hypothesis 1b).

During the interview, truth tellers and liars were shown a selection of the photographs they took. For liars, these were photographs of their 'terrorist mission' and photos of the 'promoting the tourist location' mission. For truth tellers these were only photographs aimed at promoting the square as a tourist destination. Truth tellers and liars were asked to describe what they could see on each of their photographs. Of particular interest is a possible difference between liars and truth

tellers in discussing their ‘promoting the square’ photographs. Given their terrorist mission, liars are likely to have security features in the forefront of their mind when observing and discussing their promotional photographs. According to visual attention models, people automatically guide their eyes to regions of interest especially those at the forefront of their thoughts (Oliva & Torralba, 2007). In other words, in all likelihood liars will think about the security features when discussing their promotional features, will notice them in their photographs and therefore may mention them more in interview. Liars’ avoidance of mentioning security features in the mission photographs may trigger an ironic monitoring process when discussing the promotional photographs, resulting in them over compensating and reporting more security features than truth tellers (Hypothesis 2). *The Ironic Process Theory* (Wegner, 1997) proposes that the most and the least desired effects of attempts to control one’s mental state stem from two processes, one of which is the ‘ironic monitoring process’. Wegner argues that ‘the monitor’s effects on mind can supersede those of the operator, producing the very state of mind that is least desired’ (p.148). (See also Selective Attention, Cohen, 2006). In the experiment we distinguished between security features that liars might consider a risk to mention (bins, toilets, drains, man holes and CCTV cameras) and more innocuous security features (windows and roof tops). We believe that Hypothesis 2 will particularly hold true for the more innocuous security features as liars will believe that mentioning them will not be harmful to them.

Apart from comparing truth tellers’ and liars’ promotional photographs, we also compared liars’ mission and promotional photographs. Liars’ mission photographs will be for the purpose of identifying security features, and their promotional photographs will be to show the area at its best in order to attract people. Perhaps as a result, these mission photographs will be less visually appealing than the promotional photographs (Hypothesis 3).

Method

Participants

A total of 80 participants were recruited, 52 of whom were female. The mean age was 22.55 ($SD = 6.59$). Participants were randomly allocated to the truth ($N = 41$) or lie condition ($N = 39$).

Procedure

Participants arrived at the Psychology Department for briefing with the experimenter. Truth tellers and liars had about 20 minutes to complete the task individually at Guildhall Square, which is a pedestrianised area featuring the Guildhall (a building historically used as the meeting place of a guild or corporation), civic offices and a large video screen.

Truth tellers were told that their mission was to promote being an audience member for watching the 2012 Olympics on the large video screen in Guildhall Square. They were given a camera on which to take photographs for a flyer to promote Guildhall Square as a good place to watch the Olympics. They were told to show the Guildhall and civic offices at their best so as to attract tourists, and were asked to report back to the researcher in 20 minutes to select the photographs that they thought were best for the flyer.

Liars were told that they were on a reconnaissance mission for planting a decoy device to disrupt the showing of the Olympics on the Guildhall Square screen. They were informed that they would need to decide where would be the best place to plant a device, and also to check for security within that area. Liars were also provided with a camera and asked to photograph all vantage points that they could be overlooked from, i.e. from which cameras or office windows or roof tops. They also were told to photograph potential device site points including underground locations such as manhole covers or drains. Liars were instructed to remain unnoticed and to avoid alerting anyone to what they were photographing. If asked, they were to use the truth tellers' mission as their cover story, i.e. to state that they were taking promotional photographs of Guildhall Square for a flyer to attract tourists to watch the Olympics on the screen. Liars were advised to take photographs

appropriate for this reason also. They were then asked to return to the researcher in 20 minutes to show their photos and discuss their findings in the same manner as truth tellers.

On entering the square, some participants (25 truth tellers and 25 liars) encountered a mime artist whose act involved comically impersonating people as they passed through the square. As consent to interact with the mime artist could not practically be sought from the general public, four stooges were employed to be in the square for the mime artist to interact with when the participant arrived.

Apart from impersonating the stooges, the mime artist was also instructed to interact with the participant. The experimenter texted the mime artist and the stooges a description of the participant before they arrived at the square so they were easily identifiable. As the participant returned to the researcher after completing the photograph taking exercise, the mime artist was situated en route. He approached the participant and asked if they had photographed him. If they answered 'yes' he asked if he could see the photograph, and if they said 'no' or that they weren't sure, he asked if he could check as he thought he was in the background when the participant was taking photographs. The mime artist maintained a friendly and non-accusatory attitude throughout. We selected the role of a mime artist as they are not directly associated with law enforcement, and we reasoned that being approached by a street entertainer would be plausible to participants and unlikely to raise doubts as to the questioner's integrity.

On their return to the department, all participants were told that there had been reports of people planning to plant a decoy device in Guildhall Square and that they were suspected of having being involved with this. They were told that they would be interviewed about their claim that they were working on a project to promote being an audience member for watching the 2012 Olympics in Guildhall Square.

The participants' photographs were then downloaded onto a laptop. There was no difference in the total number of photographs taken between truth tellers ($M = 17.09$, $SD = 9.47$) and liars (M

= 18.41, $SD = 11.46$), $F(1,78) = 0.30$, $p = 0.58$, $d = 0.13$. Truth tellers were asked to select the six photographs they deemed best to use for the promotional flyer. Liars were asked to select three photographs that they felt best suited their mission i.e. illustrating the vantage points and security precautions in place in Guildhall Square. They were also asked to select three photographs that they preferred for their cover story i.e. promoting Guildhall Square for the Olympics.

To motivate all participants to be convincing during the interview, participants were told that if the interviewer believed they were working on a project to promote Guildhall Square that they would receive £10, and if they were not believed that they would not receive the money but instead would be asked to write a statement explaining their whereabouts. In reality all participants received the money and none were asked to write a statement.

The interviewer was blind to the participant's veracity condition, and was given the photographs that had been selected by the participants. The interviewer showed the participant each of the six photographs one by one, and for each photograph asked them to: 'Please describe in as much detail as possible what you can see in the photograph.' In other words, the interview consisted of a single question that was asked six times.

After the interview, the participant was asked to complete a post interview questionnaire. This included the questions 'What do you think the likelihood is of you getting the £10?' and 'What do you think the likelihood is of you writing a statement?' which was rated on a scale of 1 (not at all) to 7 (totally). They were also asked whether the interview required a lot of thinking (cognitive effort) and whether it was mentally difficult, on a scale of 1 (certainly not) to 7 (certainly). Participants were all asked to rate how motivated they were to appear convincing during the interview, from 1 (definitely not) to 7 (definitely).

Coding

Photographs Taken By the Participants. A rater reported whether the mime artist was present in any of the photographs. When he was present a score of '1' was given (regardless of how

many photographs he appeared in), and if he did not occur in any of the photographs a score of '0' was given.

Interview Coding. Due to a combination of technical and logistical issues only 52 interviews (29 truth tellers and 23 liars) could be analysed. An independent rater coded the 52 transcribed interviews and photographs discussed during the interview. For each photograph the coder noted the presence of each of the following five categories of suspicious security features: CCTV cameras, toilets, drains, manholes, and bins, and each of the following two innocuous security features: windows and rooftops. Each time a category of security feature was included in a photograph a score of '1' was given. An aggregated score was created which could range from 0 (none of the features included) to 5 (all five categories of features included) for suspicious security features, and could range from 0 to 2 for innocuous security features.

For each photograph the coder further noted whether the participant reported the presence of the five suspicious and two innocuous security feature categories. Each time a category of security feature was mentioned a score of '1' was given. An aggregated score was created which could range from 0 (none of the features mentioned) to 5 (all five features mentioned) for suspicious security features and from 0 to 2 for innocuous security features.

A second coder coded a sample of 15 participants' photographs. The two sets of ratings were compared to assess inter-rater reliability. For features in the photograph (suspicious and innocuous combined) Intra Class Coefficient = 0.95, and for mentioning the features in the interview ICC = 0.89.

Apart from whether the features were present in the photographs and were reported, we also calculated the ratio between the two i.e. features reported divided by features present. The ratio score could range from 0 to 1, where a 1 would indicate that all features that were present in the photograph would be reported by the participant.

A third rater coded all photographs discussed in the interviews and judged how good/appealing the photograph makes the square look (1 very poor to 7 very good), and how

prominent the suspicious and innocuous features were in each photograph (1 not at all to 7 very prominent). A fourth coder coded a sample of 15 participants' photographs discussed during the interviews. The two sets of ratings were compared to assess inter-rater reliability. For appeal the ICC = 0.67, for prominence of suspicious features ICC = 0.62 and for prominence of innocuous features ICC = 0.89.

Results

Manipulation Checks

Truth tellers ($M = 5.27$, $SD = 1.48$) believed there was a greater likelihood that they would receive the money than liars ($M = 3.97$, $SD = 1.84$), $F(1, 78) = 12.03$, $p = 0.001$, $d = 0.78$, and truth tellers ($M = 2.88$, $SD = 1.73$) believed there was less likelihood of having to write a statement than liars ($M = 3.92$, $SD = 1.82$), $F(1, 78) = 6.86$, $p = 0.011$, $d = 0.58$. Truth tellers ($M = 3.51$, $SD = 1.79$) also thought the interview required less cognitive effort than liars ($M = 4.90$, $SD = 1.35$), $F(1, 78) = 15.12$, $p < 0.001$, $d = 0.89$, and truth tellers ($M = 3.00$, $SD = 1.66$) found the interview less mentally difficult than liars ($M = 4.00$, $SD = 1.55$), $F(1, 78) = 7.72$, $p = 0.007$, $d = 0.62$. There was no difference between truth tellers ($M = 5.93$, $SD = 0.96$) and liars ($M = 5.92$, $SD = 0.98$) in how motivated they claimed they were to appear convincing during the interview; $F(1, 78) = 0.000$, $p = 0.986$, $d = 0.01$. These mean scores (almost 6 on a 7-point scale) suggest that both truth tellers and liars were highly motivated.

Hypotheses testing

Data were analysed with Chi-square analyses or analyses of variance with Veracity (truth versus lie) as the only factor. In addition, we carried out some analyses of covariance with Veracity as factor and the prominence of features as a covariate.

Table 2. Interview Results as a Function of Veracity: Innocuous Features

	Truth tellers' promotion (N = 29)		Liars' promotion (N = 23)		F	p	d
	M	SD	M	SD			
Photograph's appeal (7 point scale)	3.20	.79	3.12	.94	.09	.76	0.09
Photographs- innocuous features prominent (7 point scale)	4.02	1.06	3.66	1.11	1.41	.24	0.33
Number of innocuous features in photograph	1.46	.37	1.30	.44	1.92	.17	0.39
Number of innocuous features reported	.03	.08	.13	.24	4.45	.04	0.63
					5.58 ¹	.02	
Ratio of innocuous features reported to innocuous features photographed	.02	.05	.11	.21	5.05	.03	0.69
					5.71 ¹	.02	

¹ Controlled for the innocuous features being prominent in the promotion photographs via an analysis of covariance

Table 3. Interview Results as a Function of Veracity: Suspicious Features

	Truth tellers'		Liars' promotion				
	promotion		(N = 23)				
	(N = 29)						
	M	SD	M	SD	F	p	d
Photographs- suspicious features prominent (7 point scale)	2.21	.71	2.83	1.33	4.65	.036	0.61
Number of suspicious features in photograph	1.64	.57	1.49	.67	.68	.41	0.24
Number of suspicious features reported	.01	.04	.14	.24	8.48	.005	0.93
					3.82 ¹	.056	
Ratio of suspicious features reported to suspicious features photographed	.006	.02	.11	.22	5.93	.02	0.87
					1.26 ¹	.27	

¹ Controlled for the suspicious features being prominent in the promotion photographs via an analysis of covariance

Cooperation with the Mime Artist. A similar percentage of truth tellers (76%) and liars (72%) had taken a picture of the mime artist, $\chi^2(1, N = 50) = .10, p = .750, \Phi = .05$, but truth tellers (36%) were more likely than liars (8%) to tell the mime artist that they had taken a picture of him, $\chi^2(1, N = 50) = 5.71, p = .017, \Phi = .34$. In addition, truth tellers (60%) were significantly more likely than liars (20%) to allow him to see the photograph ($\chi^2(1, N = 50) = 8.33, p = .004, \Phi = .41$). This supports Hypothesis 1. In fact, 82% of those who told the mime artist that they had taken a photograph of him were truth tellers; and 75% of those who allowed the mime artist to look at the photographs were truth tellers.

Reporting photograph features during the Interview. Table 2 indicates that liars' and

truth tellers' promotional photographs were rated as equally appealing. Liars reported more suspicious security features than truth tellers. However, the suspicious features were more prominent in the liar's promotional photographs and so liars perhaps found it difficult to avoid mentioning them. Indeed, when we controlled for how prominent the suspicious features were (in an analysis of covariance), the differences between liars and truth tellers in reporting them were no longer significant. In contrast, although the number of innocuous features did not differ between the liars' and truth tellers' photographs, liars reported them more, even when we controlled for how prominent the innocuous features were in the photographs. This supports Hypothesis 2. Tables 2 and 3 (ratio scores) also show that most of the suspicious and innocuous features that were on the photographs were not reported. When we considered how many participants reported security features, it was found that 48% of liars and 21% of truth tellers reported at least one suspicious or innocuous security feature. This association between mentioning security features and veracity was significant, $\chi^2(1, N = 50) = 4.29, p = .038, \Phi = .29$, and again supports Hypothesis 2.

Table 4. Liars' Interview Results as a Function of Type of Mission: Innocuous Features

	Liars mission		Liars promotion		F	p	d
	(N = 23)		(N = 23)				
	M	SD	M	SD			
Photographs appeal (7 point scale)	2.11	.79	3.12	.94	13.41	.001	1.16
Photographs innocuous features prominent (7 point scale)	3.93	1.28	3.66	1.11	.56	.46	0.23
Number of innocuous features in photograph	1.07	.56	1.30	.44	2.17	.16	0.46
Number of innocuous features reported	.23	.32	.13	.24	1.89	.18	0.36
Ratio of innocuous features reported to innocuous features photographed	.23	.31	.11	.21	2.09	.16	0.46

Table 5. Liars' Interview Results as a Function of Type of Mission: Suspicious Features

	Liars mission		Liars promotion				
	(N = 23)		(N = 23)				
	M	SD	M	SD	F	p	d
Photographs suspicious features prominent (7 point scale)	4.15	1.42	2.83	1.33	9.95	.005	0.96
Number of suspicious features in photograph	1.14	.68	1.49	.67	3.90	.06	0.52
Number of suspicious features reported	.32	.31	.14	.24	4.34	.049	0.67
					0.57 ³	.46	
Ratio of suspicious features reported to suspicious features photographed	.38	.40	.11	.22	7.55	.01	0.87
					0.93 ³	.35	

³Controlled for the suspicious features being prominent in the mission and promotion pictures

Liars' Mission and Promotional Photographs Comparison. Table 4 indicates that liars' promotional photographs were rated as more appealing than their mission photographs, supporting Hypothesis 3. In addition, Tables 4 and 5 indicate that the suspicious, but not the innocuous, security features were more prominent in the mission photographs than in the promotional photographs, partially supporting Hypothesis 3. The number of suspicious security features did not differ between liars' mission and promotional photographs, but liars reported such features more when discussing the mission photographs. A ratio of .38 indicates that they mostly avoided reporting such features in the mission photographs but a possible reason why they mentioned them more in the mission than in the promotional photographs is that such features were more prominent in the mission photographs and therefore liars found it hard to avoid mentioning them. Indeed,

when we controlled for how prominent the suspicious security features were (in an analysis of covariance), differences in reporting these features in the mission and promotional photographs disappeared. No differences emerged regarding the innocuous security features, which incidentally were largely unreported (low ratios).

Discussion

Although similar percentages of truth tellers and liars photographed the mime artist, liars were less likely to admit to photographing the mime and to allow him to see the photographs. This suggests that liars were more reluctant to comply with external requests than truth tellers. Similar findings have been reported by Vrij, Mann, Jundi, Hope and Leal (2012) in a study where an undercover interviewer who posed as a photography student asked truth tellers and liars whether he could take a photograph of them. More truth tellers than liars complied with his request. We believe that ‘cooperation’ with an undercover interviewer has potential as a diagnostic cue to deceit. Interestingly, the cue ‘cooperation’ may be relevant particularly to undercover interviews. In more formal interviews, liars will probably realise that lack of cooperation may appear suspicious and they therefore may be more willing to cooperate in formal than in undercover interviews.

One could argue that the finding that similar percentages of truth tellers and liars took photographs of the mime artist was unexpected. Liars often deem it necessary to minimise the number of potential witnesses to their activity (Granhag & Hartwig, 2008; Nahari, Vrij, & Fisher, 2012). Indeed research has shown that liars include fewer witnesses in their drawings of recalled events than truth tellers (Vrij, Leal et al., 2010; Vrij, Mann, Leal, & Fisher, 2012). Vrij and colleagues have argued that witnesses could provide accounts of the liars’ suspicious behaviour, and liars prefer to distance themselves from any potentially incriminating information, termed the ‘avoid and escape’ strategy (Granhag & Hartwig, 2008). The fact that so many liars (72%) have photographed the mimic could be down to a practical issue. The space liars were instructed to photograph was limited, and the mime artist was freely mobile within the space. In order to attain the necessary photographs, liars may have been compelled to on occasion include the mime artist in the photographs too.

Alternatively, they may have been so focussed on the mission and the parts of the square they wanted to photograph that they did not even notice the mime artist. Finally, the mime artist was a prominent and enjoyable presence at the square and perhaps liars realised that he could feature well in their promotional photographs.

Reporting Security Features during the Interview. The dedicated promotional photographs from truth tellers and liars did not differ in terms of appeal, which demonstrated that liars succeeded in taking convincing photographs for their cover story. Yet, the way they discussed these promotional photographs in the formal interview served to highlight their deception. Although the number of suspicious security features did not differ between liars' and truth tellers' promotional photographs, liars reported them more frequently. This may be a tactical move by liars. When suspicious security features are prominent in the promotional photographs, failing to address them may have looked suspicious. There also may be cognitive dissonance at play, in which they believe two contradictory things. In this case, it is the discrepancy between the clear presence of the suspicious security features and the need to avoid mentioning them. This is supported by the finding that when the prominence of suspicious security features were controlled for there was no longer a significant difference between liars and truth tellers in reporting them.

Although the number of innocuous security features did not differ between the liars' and truth tellers' promotional photographs, liars reported them more frequently, even when we controlled for how prominent the innocuous security features were in the promotional photographs. The move to openly discuss seemingly innocent security features could be the result of the ironic monitoring process. The fact that liars discussed innocuous security features more than truth tellers is interesting given that liars took effort to hide the aim of their mission (indicated by the low ratios of reporting innocuous as well as suspicious security features in the mission photographs).

Implications. Undercover interviewing could be useful in sensitive situations. If the photographer is innocent, some friendly questions about their photographs by an undercover interviewer are unlikely to cause wariness or unease. Indeed this has been shown in a previous

study where actual members of the public were approached by an undercover interviewer in a casual and personable manner, and all proceeded to speak with him (Vrij et al, 2012). If the photographer has illicit intentions, it also may be preferable for an undercover interviewer to approach them rather than an identifiable law enforcement official who may cause them to react suddenly either on their own or by alerting accomplices, which could have potentially catastrophic consequences.

The results are interesting for lie detection and particularly counter terrorism measures. Approaching the photographer in an undercover manner could elicit an incriminating response (or indeed one that is indicative of innocence). Naturally the investigator does not have to pose as a mime artist, but could take the guise of a fellow tourist or photographer for example. If the photographer's reaction to them gives rise to suspicion, the suspect could be brought in for a formal interview and questioned about the photographs.

We appreciate that ethical considerations need to be made when undertaking undercover investigations. The 1950 European Convention for the Protection of Human Rights and Fundamental Freedoms (ECHR), states that 'Everyone has the right to respect for his private and family life, his home and his correspondence' (Article 8(1)). This is further qualified by Article 8(2) in its assertion that 'There shall be no interference by a public authority with the exercise of this right except such as is in accordance with the law and is necessary... in the interests of national security, public safety or the economic well-being of the country, for the prevention of disorder or crime... or for the protection of the rights and freedoms of others' (Convention for the Protection of Human Rights and Fundamental Freedoms as amended by Protocols No. 11 and No. 14). Therefore investigators deploying undercover operations must ensure that in the likely event of breaching Article 8(1), the operation is lawful and pursuant to legitimate aim, as outlined in Article 8(2) (Harfield & Harfield, 2005).

Conclusion

To our knowledge this is the first investigation to explore the link between photography and deception. Liars were less cooperative than truth tellers in discussing their photographs with an undercover interviewer. When discussing the photographs in a formal interview liars reported the innocuous security features more frequently than truth tellers. The findings suggest that photography and deception is a subject that could prove important to explore to benefit forensic and counter-terrorist practice.

Part III Collective Interviewing to Detect Deception

Chapter 5: Experiment 4a) ‘Who Should I look at?’

Abstract

Pairs of liars and pairs of truth tellers were interviewed and the amount of eye contact they made with the interviewer and each other was coded. Given that liars take their credibility less for granted than truth tellers, we expected liars to monitor the interviewer to see whether they were being believed, and to try harder to convince the interviewer that they were telling the truth. It was hypothesized that this monitoring would manifest itself through more eye contact with the interviewer and less eye contact with each other than in the case of truth tellers. A total of 43 pairs of participants took part in the experiment. Truth tellers had lunch in a nearby restaurant. Liars took some money from a purse, and were asked to pretend that instead of taking the money, they had been to a nearby restaurant together for lunch. Pairs of liars looked less at each other and displayed more eye contact with the interviewer than pairs of truth tellers. The implications of these findings are discussed.

Who should I look at?

Eye Contact during Collective Interviewing as a Cue to Deceit

The threat of terrorism has led to an increased emphasis on the detection of deception in public spaces including country borders, security checkpoints, bus terminals, train stations, shopping malls, and sport venues (Cooke & Winner, 2008; Driskell, Salas, & Driskell, in press; Kimery, 2008). Deception detection in such situations differs in several ways from deception detection in police suspect interviews, the traditional domain of forensic deception research (Vrij & Granhag, in press; Vrij, Granhag, & Porter, 2010). For example, in police interviews investigators typically focus on a suspect's *past* activities, but in homeland security settings investigators are often interested in someone's *future* activities (e.g., intentions). Deception research about intentions has commenced with the publication of six experimental studies (Clemens, Granhag, & Strömwall,

2011; Granhag & Knieps, 2011; Vrij, Granhag, Mann, & Leal, 2011; Vrij, Leal, Mann, & Granhag, 2011; Vrij, Mann, Jundi, Hope, & Leal, in press; Warmelink, Vrij, Mann, Leal, Forrester, & Fisher, 2011). Another difference is that in homeland security settings investigators, and particularly those who are working in an undercover capacity, sometimes have good reason not to tell the interviewees that the ‘chat’ they have with them is in fact an interview. For this reason researchers have started to conduct deception research in which undercover interviewers conduct interviews without the interviewees being aware that they are being interviewed (Vrij et al., in press). A third difference is that terrorist acts are often planned and executed by groups rather than individuals (Crenshaw, 1990). For example, the terrorists travelled together to London to carry out the London 2005 bombings. Consequently researchers have started to conduct deception research involving groups of truth tellers and liars (Driskell et al., in press; Granhag, Strömwall, & Jonsson, 2003; Meijer, Smulders, & Merckelbach, 2010; Vrij et al., 2009). A fourth difference is that police suspect interviews are typically focussed on solving crimes through obtaining admissions or confessions from suspects, whereas homeland security interviews are more about gathering information (Borum, 2006; Brandon, 2011; Driskell et al., in press; Loftus, 2011). The third and fourth reasons combined demonstrate the relevance of collective interviewing, that is, interviewing people together. If people have jointly experienced events or have made joint preparations for a forthcoming activity it makes sense to interview them together about it because in collective interviews people recall more information about shared experiences than when they are interviewed separately about these shared activities (Hollingshead, 1998; Rajaram, 2011; Rajaram & Pereira-Pasarin, 2010; Ross, Blatz, & Schryer, 2008; Wegner, 1987; Wegner, Erber, & Raymond, 1991).

The present experiment dealt with collective interviewing and we examined mutual gaze between the pairs of interviewees and the extent to which the interviewees made eye contact with the interviewer. Eye contact is a fundamental aspect of interaction and communication (Frischen, Bayliss, & Tipper, 2007; Kleinke, 1986) and is investigated as a nonverbal cue to deception frequently (DePaulo et al., 2003; Vrij, 2008). Both laypeople and professional lie detectors expect

liars to exhibit gaze aversion, that is, to look away from the interviewer (Strömwall, Granhag, & Hartwig, 2004; Vrij, 2004, 2008; Vrij, Akehurst, & Knight, 2006). However, meta-analyses revealed that gaze patterns are not a diagnostic cue to deceit (DePaulo et al., 2003; Sporer & Schwandt, 2007). In fact, DePaulo et al. (2003) report an effect size of $d = .03$ for the relationship between gaze and deception. Despite the fact that gaze patterns have not been found to be diagnostic for deceit we decided to examine eye gaze again as we predicted that it would be indicative of deceit when pairs of suspects are concerned.

Research on truth tellers' and liars' preferred strategies during interviews gives insight into which gaze patterns may arise. It has been found that, when asked to recall an event, truth tellers reconstruct the event from memory and prefer a 'tell it all' approach, aiming to provide a detailed description of what happened. In contrast, liars do not reconstruct a story but report their planned alibi. In terms of detail, they prefer a 'keep it simple' approach; incorporating enough detail so as not to raise suspicion, but avoiding giving excessive detail for fear that the interviewer may know or could subsequently find out that the story is fabricated (Granhag, Strömwall, & Jonsson, 2003; Hartwig, Granhag, & Strömwall, 2007; Strömwall, Hartwig, & Granhag, 2006).

When pairs of truth tellers implement their 'tell it all' approach during an interview, they may communicate substantially with each other in an attempt to collectively recall all the details they know, and to correct each other's stories. In this respect, Hollingshead (1998) refers to *transaction information search* in which group members work together to retrieve information by cuing one another, posing questions to one another, and verbalising connections. Transactive memory refers to a shared system in which information is encoded, stored and retrieved collectively in groups (Wegner, 1987).

Retrieving transactive memories of a shared event is social and interactive; thus people recalling an actual jointly experienced event will do so in a different manner to people attempting to recall a fabricated event. Truth tellers will retrieve their information through a transactive memory system in which responsibility for encoding information is shared and divided, and retrieval of information

involves the group working together, e.g. by cueing one another and posing questions to one another. Conversely liars will rely on their individual cognitive ability to construct a story that matches with what the other people in their group are saying (Hollingshead, 1998).

During this group recall process individuals are likely to gaze at each other, as this is typically what people do when they communicate (Frischen et al., 2007; Kleinke, 1986). In contrast, pairs of liars' 'keep it simple' approach may result in less communication between the liars. For example, one liar may take the lead in giving the answer and the other liar may not add or correct much. Less communication between the pair would therefore take place, resulting in less gazing towards each other. In sum, we predicted that pairs of truth tellers would look more at each other than pairs of liars (Hypothesis 1).

Driskell et al. (in press) also examined gaze in their experiment about collective interviewing and found that truthful pairs of interviewees indeed looked more at each other than deceptive pairs of interviewees, the effect we hypothesised in Hypothesis 1. However, they did not examine making eye contact with the interviewer. To justify this they refer to DePaulo et al.'s (2003) meta-analysis which showed that gaze did not emerge as a diagnostic cue to deceit. In addition, they quote Ekman and Friesen (1972) who argued that nonverbal behaviour may be especially indicative of deceit when individuals are alone, because in that situation his/her nonverbal behaviour is less subject to inhibition or control for social reasons. In other words, social factors are seen as noise by Ekman and Friesen (Driskell et al., in press).

We examined making eye contact with the interviewer because there are good reasons to predict that pairs of liars will make more eye contact with the interviewer than pairs of truth tellers. Firstly, it could be a simple effect of opportunity. Since liars will look less at each other than truth tellers they will have more opportunity to make eye contact with the interviewer. Secondly, liars take their credibility less for granted than truth tellers and are therefore more inclined than truth tellers to try to appear convincing (Kassin, Appleby, & Torkildson-Perillo, 2010) and people attempt to

persuade others by looking them in the eyes (Frischen et al., 2007; Kleinke, 1986). Thirdly, because liars do not take credibility for granted, they may monitor the interviewer's reactions more carefully in order to assess whether they appear to be getting away with their lie (Buller & Burgoon, 1996; Schweitzer, Brodt, & Croson, 2002). We therefore hypothesised that pairs of liars would make more eye contact with the interviewer than pairs of truth tellers (Hypothesis 2). Of course, attempting to appear convincing and monitoring the interview also applies to individual liars, yet in individual settings no difference between liars and truth tellers in making eye contact with interviewers seem to emerge. A possible explanation is that in such interviews truth tellers also look at the interviewer, not so much because they try to convince or monitor the interviewer but for the simple reason that they communicate with them and are inclined to make eye contact with the person they are communicating with. In collective interviews the presence of a second interviewee gives truth tellers a good reason to look away from the interviewer and therefore differences between truth tellers and liars in making eye contact with the interviewer may emerge.

We also examined the strategies that truth tellers and liars reported to have planned to use during the interview (asked in a questionnaire before the interview), and the strategies they reported to have used during the interview (asked in a questionnaire after the interview). Because liars tend to take their credibility less for granted than truth tellers, we predicted that liars are more likely to have planned and executed strategies than truth tellers (Hypothesis 3). The content of the strategies could also differ. Liars will place more emphasis on trying to appear more convincing than truth tellers (Hypothesis 4), and this may be reflected verbally (e.g., by controlling stuttering) and/or nonverbally (e.g., the desire to gaze at the interviewer).

Method

Participants

A total of 86 participants took part, 25 of whom were male (29%). The average age of participants was $M = 22.04$ ($SD = 6.38$) years.

Procedure

Pairs of friends, partners or colleagues were recruited under the guise of a study to find out how well they know each other. We recruited pairs who knew each other because this reflects real life situations: criminals acting together are likely to know each other as well. Each pair was randomly allocated to either the lying or truth telling condition.

Upon arrival, pairs of truth tellers ($N = 21$) were told that the study would take place in a nearby shopping complex and were taken there by an experimenter. On reaching the shopping complex, the experimenter pretended to receive a text informing them that the study was delayed. Purportedly as compensation, the participants were offered lunch in a restaurant where they were left alone and then collected by the experimenter 45 minutes later.

After returning to the laboratory, participants were told that £10 had gone missing from the department whilst they were having lunch. They were informed that they were suspected of having taken it and would be interviewed about their recent activities to assess whether they were guilty or not. They were given time to prepare for the interview together but were not told whether they would be interviewed together or separately.

On arriving at the laboratory, pairs of liars ($N = 22$) were asked to 'steal' £10 from a purse in a separate office and return to the laboratory. On their return, they were informed that they were suspected of having taken the money and would be interviewed about their activities during the past hour. Their alibi would be that they had gone to a restaurant in the shopping complex for lunch. As with the truth tellers, they were given time to prepare together but were not informed as to how the interview would be conducted. The scenario is derived from Strömwall, Granhag, and Jonsson (2003) and Vrij et al. (2009).

To motivate participants to perform well, they were told that if the interviewer believed them, they would receive a total of £10 each. If they were not believed, they would not receive any money and may be asked to write a statement detailing their whereabouts during the time the money went missing. In fact all participants were ultimately given the £10 reward following debriefing.

After their preparation, the pairs were split up and individuals were each taken to separate

rooms to complete a pre interview questionnaire which asked about their preparation e.g., ‘Did you develop an interview strategy together with your friend?’, and ‘If so please describe this strategy’. There were questions about whether they had discussed with their friend what to say and how to behave during the interview, on 7-point Likert scales ranging from (1) not at all to (7) thoroughly. They were also asked to rate how thorough, sufficient and good their preparation talks were on three individual scales ranging from (1) not at all to (7) extremely.

After completing the questionnaire, pairs of participants were taken to the interview room to be interviewed together. They were informed they would be audio and visually recorded. The interviewer was blind as to the veracity condition of the participants. They were asked about their experience in the restaurant through general, spatial and temporal questions, based on a format from a previous study (Vrij et al., 2009). Examples of questions include: ‘Can you tell me in as much detail as possible what you did while you were in the restaurant?’ (general); ‘In relation to the front door, where did you and your friend sit?’ (spatial); and ‘How long did it take between the staff taking your order and receiving your food?’ (temporal). The interviewer was instructed to be conscious of her eye gaze in order to address each participant as equally as possible, and not to influence who would answer the question.

After the interview, pairs were split up once more and the individuals asked to complete a post interview questionnaire. This asked about how motivated they were to appear convincing on a 7-point Likert scale ranging from (1) not at all motivated to (7) extremely motivated. They were also asked if there were any awkward moments during the interview on a 7-point Likert scale ranging from (1) none at all to (7) plenty. The questionnaire also contained open ended questions about details of the strategies they had planned and executed (summarised in Table 6), and whether there was a particular behavioural pattern they felt they should have displayed in order to be believed.

Coding

Interviews were videotaped and coded by a rater who was blind to the veracity status of the

pairs. Frequency of eye contact with (i) each other (i.e. the amount they looked into each other's eyes), and (ii) the interviewer was coded on 7-point Likert scales ranging from (1) no incidence of eye contact to (7) high incidence of eye contact. A second rater coded a random sample of 15 interviews. Inter-rater reliability scores (Pearson correlations) were high (eye gaze with interviewer: $r = .83$, eye gaze with each other: $r = .74$).

Strategies reported by participants were categorised according to themes, e.g., to keep calm, to improvise, to stick to an alibi. These categories were determined after examining the data. They were categorised by two independent raters with an inter-rater reliability score of $r = .55$. A comparison between the two coders revealed that one coder used the miscellaneous category more often than the other. In those instances in which one strategy was classified as miscellaneous by one coder but as categorical by another coder, we selected the categorical coding.

Results

Manipulation Checks

Participants had an average rating of $M = 5.74$ ($SD = 1.40$) on the 7-point motivation scale which means that they were highly motivated to appear convincing. However, although truth tellers were clearly motivated ($M = 5.24$, $SD = 1.61$), liars rated themselves as being even more motivated ($M = 6.26$, $SD = 0.90$), $F(1, 86) = 13.03$, $p = 0.001$, $d = 0.81$. Truth tellers rated themselves as being more likely to receive the cash reward ($M = 5.49$, $SD = 1.47$) when compared to liars ($M = 4.56$, $SD = 1.65$), $F(1,86) = 7.81$, $p = 0.006$, $d = 0.60$. Truth tellers rated themselves as being less likely to have to write the statement ($M = 2.89$, $SD = 1.56$) when compared to liars ($M = 4.07$, $SD = 1.58$), $F(1,86) = 12.48$, $p = 0.001$, $d = 0.75$. In summary, the participants were highly motivated to be convincing and the reward and penalty instructions appeared plausible.

Eye Movements

Two one way ANOVAs were conducted with Veracity as between-subjects factor and making eye contact with the interviewer and looking at each other as dependent variables. There was a significant Veracity effect for the amount of eye gaze with the interviewer, $F(1,41) = 6.61$, p

= .014, $d = 0.77$, with liars making more eye contact with the interviewer ($M = 5.18$, $SD = 1.10$) than truth tellers ($M = 4.26$, $SD = 1.18$). In addition, truth tellers ($M = 3.74$, $SD = 1.57$) looked more at each other than liars ($M = 3.00$, $SD = 1.41$), $F(1,41) = 4.11$ $p = .049$, $d = 0.62$. These findings support Hypotheses 1 and 2.

Strategies

A Multivariate analysis was conducted on strategies detailed in the pre and post interview questionnaires (Table 6), $F(7, 71) = 202.90$, $p < .001$. Liars rated their preparation talks as being significantly more thorough and sufficient and of higher quality than truth tellers. Similarly, liars had significantly more of a discussion than truth tellers on what to say and how to behave during the interview.

More liars ($N = 31$) than truth tellers ($N = 12$) developed a strategy prior to the interview; ($\chi^2 = 18.16$, $df = 1$, $p < .001$). This finding supports Hypothesis 3. Truth tellers largely reported that the reason they did not prepare a strategy before the interview was because they found it unnecessary ($N = 28$), or they used a “stick to the story/tell them how it was” strategy ($N = 13$). Liars’ reported strategies were using an alibi/proof ($N = 28$) and behaving calmly and not stuttering ($N = 11$), which supports Hypothesis 4. These strategies are summarised in Table 7.

In the post interview questionnaire, liars reported experiencing more awkward moments during the interview than truth tellers. Liars also felt more so than truth tellers that there was a particular behavioural pattern they should have displayed in order to be believed. When asked what this was, the most frequent response amongst liars was to have behaved more calmly ($N = 8$). A less frequent response amongst liars was that they should have been less nervous ($N = 6$). A proportion of liars mentioned eye contact ($N=8$), such as their eye contact with each other and with the interviewer. Of these comments the most common was that they should have made less eye contact with each other ($N = 5$).

Table 6: Questionnaire Responses of Liars and Truth Tellers

	Asked	Truth		Lie		F	p
	Pre/Post						
	interview						
		M	SD	M	SD		
Extent of discussion about what to say during the interview	Pre	3.77	1.87	5.49	1.26	25.14	<0.001
Extent of discussion about how to behave during the interview	Pre	2.33	1.49	3.67	1.82	14.32	<0.001
Thoroughness of preparation talks	Pre	3.86	1.69	5.44	1.23	23.73	<0.001
Quality of preparation talks	Pre	4.35	1.86	5.35	1.39	7.62	0.007
Motivation to appear convincing during interview	Post	5.24	1.61	6.26	0.90	13.03	0.001
Awkward moments experienced during the interview	Post	2.29	1.06	3.56	1.40	23.11	<0.001
Should have displayed particular behavioural pattern in order to be believed	Post	1.69	1.29	3.50	2.04	24.81	<0.001

Table 7: Summaries of Strategies as Reported by Participants

Strategy	Number of truth tellers who report it	Number of liars who report it
Strategy is not useful/necessary	28	4
Will use alibi/proof	2	28
Stick to story/told them how it was	13	0
Behave calmly	1	11
Give a lot of detail	6	11
Based on past experience	0	3

Discussion

We compared the eye gaze patterns displayed by pairs of truth tellers and pairs of liars. Pairs of truth tellers looked more at each other than pairs of liars and pairs of liars made more eye contact with the interviewer than pairs of truth tellers.

The finding of a mutual gaze between pairs of truth tellers is a replication of Driskell et al. (in press). . The fact that two independent labs have obtained the same result strengthens the ecological validity of this result. This novel finding contradicts the stereotypical belief that liars look away (Strömwall et al., 2004; Vrij, 2004, 2008; Vrij et al., 2006). One explanation for this gaze pattern is that liars attempt to convince the interviewer of their truthfulness more than truth tellers. Indeed when examining strategies from this study, prior to the interview liars stated intentions such as ‘To behave calmly, not to ... show we are worried’. Post interview, liars indicated that they were concerned they had looked at each other too much and did not maintain enough eye contact with the interviewer. This supports the idea that liars believe looking at the interviewer will increase their credibility. It is also possible that liars will have less reason to communicate with each other and so will have more opportunity to look at the interviewer. In other words, the effect of making eye contact with the interviewer has more opportunity to occur in collective interviews rather than single interviews. Future research could examine this hypothesis.

In contrast, truth tellers stated that they found preparing a strategy unnecessary, stating that ‘the facts/information will speak for themselves’ and ‘you don’t need a strategy in order to be

honest'. This indicates that truth tellers are less likely to try to be especially convincing, perhaps because they believe that the truth shines through anyway. This phenomenon is known as the 'illusion of transparency' (Gilovich, Medvec, & Savitsky, 1998) and is evident in the current study as significantly more liars than truth tellers developed a strategy, and that liars rated their preparation talks as being significantly more thorough, sufficient and good than truth tellers.

In the present experiment the interviewer addressed each participant equally in terms of eye gaze, but manipulations are possible in this respect. For example, if the interviewer responds to eye gaze by either ignoring or returning it which may affect the interviewee. To determine whether the interviewer is in fact being monitored to see if they believe the interviewee, the interviewer could intentionally appear agreeable or sceptical and examine how the interviewee responds. Another possibility would be for interviewers to direct their eye gaze more at one interviewee than another in the collective group to see if it influences the pattern of response. In the current study gaze behaviour was coded by raters who observed the videotaped interviews. In the future researchers could examine whether interviewers themselves can accurately rate the interviewees' gaze patterns.

It is not our intention to promote collective interviewing as a substitute for individual interviewing. This is one reason why we did not include an individual interviewing condition in our experiment. Interviewing suspects individually allows investigators to examine content cues such as discrepancies between stories of multiple suspects, which could be an efficient way to detect deceit when the correct questions are asked as research has shown (Vrij et al., 2009). With this in mind, we propose that collective interviewing can be used in addition to individual interviewing in certain settings. Homeland security settings (interviews at country borders, security check points, bus stations, train stations, shopping malls and sporting venues) are examples for when collective interviewing is appropriate. In such situations investigators might use collective interviewing by way of an initial screening interview. So they could employ collective interviewing and, if the group raises suspicion, follow protocol for investigating suspicious behaviour (e.g. thoroughly checking the contents of the cars and/or possessions of the persons, or indeed proceeding to interview

individuals separately.). Although the current study examined collective interviewing amongst pairs, the technique is not limited to pairs and could be used with groups of more than two individuals. Future research could examine interviewing with larger groups to ascertain whether the communicative patterns differ. Another possible line of research would be to indeed use the collective interview as a ‘screening’ interview before splitting suspects up, as suggested, to determine whether it could provide viable cues to deceit.

Our deception scenario reflects a formal police interview setting, but the present findings also have ecological validity for homeland security settings. Police interviews differ from security setting interviews in at least two ways. Firstly, police interviews are more formal. Secondly, in police interviews past activities are typically discussed whereas in homeland security settings, past as well as future activities (e.g., intentions) are discussed. The rationale on which the findings in the current study were based i.e., that liars distance themselves from revealing details they think will raise suspicion, also applies to informal interviews and discussions about intentions. So from a theoretical point of view, the findings we obtained in the present experiment are still applicable in these situations.

Chapter 6: Experiment 4b) Collective Interviewing of Suspects

Abstract

Pairs of truth tellers and pairs of liars were interviewed together about a shared experience. Given that in interviews truth tellers tend to adopt a “tell it all” strategy whereas liars prefer to keep their stories simple, we predicted that pairs of truth tellers would (i) interrupt and (ii) correct each other more, and would (iii) add more information to each other’s answers than pairs of liars. The results supported these hypotheses. Theory-driven interventions to elicit more cues to deception through simultaneous interviewing are discussed.

Introduction

Deception research typically focuses on individual truth tellers and liars whereas criminals often commit crimes in groups. A small number of studies have examined groups of truth tellers and groups of liars, and in these studies the group members were interviewed separately (Granhag, Strömwall, & Jonsson, 2003; Meijer, Smulders, & Merckelbach, in press; Vrij et al., 2009). This separate interviewing of group members may reflect many real -life interviewing contexts, but there are good reasons to consider interviewing group members together. First, conditions suited to collective interviewing occur frequently (e.g., road border controls where cars containing several people are checked). Second, it enables interviewers to examine how group members communicate with each other when lying. Such communication cues have never been examined in deception research but were the topic of this investigation.

Research on truth tellers’ and liars’ preferred strategies during interviews gives insight into which type of communication cues may arise. Truth tellers prefer a ‘tell it all’ approach and aim to provide a detailed description of what happened, whereas liars prefer a ‘keep it simple’ approach, incorporating fewer details (Hartwig, Granhag, & Strömwall, 2007). This differential approach of truth tellers and liars could result in differential group interactions when being interviewed simultaneously. We predicted that truth tellers would be more likely to interrupt and add

information to each other's accounts while also seeking to correct or amend each other's account more often than liars.

Method

Participants

A total of 86 participants (University students and employees) took part, 25 were male (29%) and 61 were female (71%). Their average age was $M = 22.04$ ($SD = 6.38$) years.

Procedure

The procedure was derived from Vrij et al. (2009). Pairs of friends were recruited under the guise of a social communication experiment. Upon arrival in the laboratory, half of the pairs (truth tellers) were told that the study was delayed with 45 minutes and that, as compensation, they were offered lunch in a nearby restaurant for that period of time. An escort brought each pair to a predetermined restaurant and collected them 45 minutes later. When they arrived back at the laboratory the pair were told that an amount of money had gone missing during the previous hour and that as suspects they would be questioned about their activities in the restaurant. They were given as much time as they liked to prepare themselves for the interview but not informed about how the interviews would be conducted.

The other half of the paired participants were allocated the role of liars. Upon arrival in the laboratory they were asked to take £10 from an office and to return to the lab. After their return to the lab they were told that they would be interviewed about their activities. They were instructed to prepare an alibi that would enable them to tell the interviewer that they went together to a nearby restaurant for a 45-minute lunch. They were given as much time as they liked to prepare themselves for the interview.

To motivate the truth tellers and liars they were informed that if the interviewer believed the participant's account, they would be paid £10. In contrast, if the interviewer did not believe the participant, they would not receive any monetary reward, and may be asked to write a statement about their whereabouts during lunch-time instead.

Once each pair of truth tellers or liars indicated they were ready to be interviewed (always within 10 minutes), they were taken to the interview room where they were interviewed together. The interviewer asked questions about their experiences in the restaurant using a standardised 32-question interview protocol derived from Vrij et al. (2009). The interviewer did not place any constraints on turn-taking during the interview and left it entirely up to the participants to decide who would answer each question.

The interviews were videotaped and coded by a rater who was blind to the hypotheses and the veracity status of the pairs. Interruptions were defined as any utterance that took place while the other member of the pair was still speaking. Corrections were defined as an explicit contradictions uttered subsequently to something the other participant has said (e.g. "No, I think it was on the right side, not the left"). Additional information was defined as new information introduced by the other participant. The frequency of occurrence of interruptions, corrections and additional information was collated. A second rater, blind to the veracity status and hypotheses, coded a random sample of 15 interviews. Inter-rater reliability scores (Pearson correlations) were high (interruptions: $r = .74$; corrections: $r = .78$; additional information: $r = .89$).

Results

Data were analysed with a MANOVA with Veracity as between-subjects factor. At a multivariate level, the analysis revealed a significant Veracity effect, $F(3, 39) = 5.56, p < .01$. All three univariate Veracity effects were also significant (see Table 8). As predicted, the pairs of truth tellers made more interruptions and corrections and added more information than the pairs of liars.

Table 8. Participants' Responses as a Function of Veracity

	Truth		Lie		F	p	d
	M	SD	M	SD			
Interruptions	8.57	8.45	2.73	2.96	9.34	< .01	1.02
Corrections	1.48	1.75	.14	.35	12.39	< .01	1.34
Additional information	30.86	13.80	18.32	12.70	9.63	< .01	0.94

Discussion

We examined the use of communication cues between pairs of truth tellers and between pairs of liars as a possible cue to deceit. Truth tellers interrupted and corrected each other more and added more information to each other's stories. This reflects the preferential strategies of truth tellers and liars in interviews: Truth tellers prefer to 'tell it all' whereas liars prefer to keep their stories simple. We can therefore conclude that communication cues can be used to detect deceit. We selected the communication cues 'interruptions', 'corrections' and 'additional information' as these cues can be easily observed by interviewers. However, other verbal cues may also be worth examining, such as 'dominance', that is, who does most of the talking. Liars may decide to let one person do most of the talking in order to retain the simplicity of the account. Nonverbal cues can be worth examining too, such as eye contact. For different reasons we predict that lying pairs would look more at the interviewer and less at each other than truth telling pairs. Liars are more inclined than truth tellers to try to appear convincing (DePaulo et al., 2003), and people attempt to convince others by looking them in the eyes (Kleinke, 1986). Liars take their credibility less for granted than truth tellers (Kassin, 2008; Kassin, Appleby, & Torkildson-Perillo, 2010), and as a result they may monitor the interviewer's reactions more carefully in order to assess whether they appear to be getting away with their lie (Buller & Burgoon, 1996; Schweitzer, Brodt, & Croson, 2002). In essence, liars may be more concerned with maintaining eye contact with the interviewer than with

each other to maintain credibility, whereas eye contact may facilitate natural communication between dyads.

The current chapter is the first to demonstrate that communication cues displayed by pairs of interviewees provide cues to deception. Furthermore, we believe that specific theory-based interventions made by the interviewer will also elicit further cues (Vrij, Granhag, Mann, & Leal, 2011; Vrij, Granhag, & Porter, 2010). For example, the interviewer could cut off the first participant while s/he is talking and ask the second participant to continue. In cases of fabrication, the second participant will then be forced to continue the fabrication started by the first participant. This is cognitively demanding if the fabrication has not been prepared in advance and requires good improvisation skills from the second participant. Cues of cognitive load (contradictions, implausible answers) may occur (Vrij et al., 2009). Interviewers can increase the chance that participants have not prepared answers by asking questions which are unanticipated (Vrij et al., 2009).

Second, the interviewer could repeat some of the questions asked earlier in the interview and could hereby indicate which of the two participants should answer the question. A comparison could then be made in the overlap in answers when (i) the participant is asked to repeat the information s/he gave before and when (ii) the participant is asked to repeat the information the *other participant* gave before. The latter should be more cognitively demanding than the former (Pezdek, Lam, & Sperry, 2009) resulting in less overlap and more contradictions.

In summary, collective interviewing has clear potential for lie detection. We have shown that verbal communication cues between pairs of interviewees can reveal deceit, and argued that gaze patterns may be useful to examine. When interviewers employ specific theory-based interventions further cues could be elicited.

Part IV Using Undercover and Collective Interviewing to Detect Deception

Chapter 7: Experiment 5 ‘Erm, What Did I tell the Other Guy?’

Abstract

We examined the potential of undercover interviewing and collective interviewing in eliciting cues to deceit in intelligence interviews. Twenty-four pairs of truth tellers and 23 pairs of liars undertook a mission in which they were interviewed covertly in a park by an undercover interviewer, and then had a later formal, forensic style interview with a second interviewer. Truth tellers and liars went to the park for different reasons and carried out somewhat different activities, and liars were instructed that if they were asked about their activities to conceal their true reason for visiting the park and to pretend to be there for the same reason as truth tellers. Based on theoretical principles about short term gains, lack of cognitive flexibility, tendency to avoid reporting potential incriminating information, memory deficits, lack of imagination and transaction information search we expected liars to be less forthcoming about their meeting with the undercover interviewer and to show less overlap in their answers in the undercover and formal interviews. We also expected them to report fewer unexpected events, and to consult each other less during the formal interview. The hypotheses were supported and the implications for intelligence interviewing are discussed.

Introduction

Investigators typically attempt to detect deceit in a one-to-one basis during formal interviews (e.g., police suspect interviews), and, unsurprisingly, forensic deception research reflects this type of lie detection (Vrij & Granhag, 2012; Vrij, Granhag, & Porter, 2010; Vrij, Mann, & Leal, in press). However, lie detection is also relevant in different settings. For example, investigators working in an undercover capacity may not wish to break their cover by inviting a person of interest to a formal interview because it could alert a potential suspect to the fact that they are of interest to

investigators. It would also break the cover of the undercover operative which is also a serious (and potentially dangerous) issue.

Undercover interviews are frequently conducted by undercover officers during domestic policing (e.g., investigating drugs cartels, human trafficking and other crimes often carried out by complex networks) and by officers who examine terrorist-related events. In addition, investigators working at public spaces (e.g., airports, stations, shopping malls) may wish to talk to groups of individuals rather than single individuals. To address such investigative contexts, researchers have started to explore lie detection through undercover interviewing and collective interviewing (Vrij, Jundi, et al., 2012; Vrij, Mann, Jundi, Hope, & Leal, 2012). Extending this literature in the current study, we examined whether undercover interviews can be utilised to establish evidence, and whether collective interviews reveal diagnostic cues to deceit when interviewees carry out a joint task during the interview. We start with discussing undercover interviewing.

Undercover Interviewing

Undercover interviewing refers to conducting interviews without the suspect actually knowing they are being interviewed (Vrij et al., 2012). Undercover interviewing has several advantages over formal interviewing in a number of investigative contexts. For example, in formal interviews suspects may be aware that one of the aims of the interviewer is to judge their veracity, which may hamper lie detection. Most lie detection techniques used to date are anxiety based (Vrij, 2008; Vrij, Granhag, Mann, & Leal, 2011), and the assumption of such techniques is that liars; due to their fear of being ‘caught’, will be more anxious during interviews than truth tellers and will therefore display more or stronger cues of anxiety (Inbau, Reid, Buckley, & Jayne, 2013; Vrij, Granhag, & Porter, 2010; Warmelink, Vrij, Mann, Leal, Forrester, & Fisher, 2011). However, truth tellers may also show signs of anxiety when they are interviewed, as a consequence of being suspected of wrongdoing or out of fear of not being believed (Bond & Fahey, 1987; DePaulo et al., 2003; Ofshe & Leo, 1997). These signs of anxiety in truth tellers may, therefore, negate any observable differences in anxiety between truth tellers and liars. Because truth tellers should display fewer signs of anxiety when they are

unaware of being interviewed, undercover interviews could, therefore, provide more opportunities for a differentiation between truth tellers and liars in terms of anxiety. Liars would in theory be more anxious than truth tellers during undercover interviews, as they are performing suspicious activities and the interview would interrupt their foreseen activities. Indeed research has shown that people who make specific plans for the future do not simply memorize their plans (Watanabe, 2005), but ‘pre-experience’ the event and activate concrete mental images of the future (Granhag, 2010). If liars pre-experience their suspicious activities unfolding in a particular way, being interrupted by an undercover interview is likely to induce more anxiety than in truth tellers whose activity is innocent and therefore unfolding in less tense situations.

Another advantage is that undercover interviewing may fit particularly well in determining the veracity of an individual’s *intentions* when no crime has yet been committed. In cases where available intelligence points to a potential plot or criminal intent but the crime has not yet been committed, a formal interview may be inappropriate. Being able to discriminate between true and false intent is of supreme importance to police and intelligence work, as it is a fundamental part of crime prevention including crimes as serious as terrorist attacks. Recent research by Vrij et al. (2012) demonstrated that short undercover interviews can be used to determine whether people are telling the truth or lying about their intentions. Amongst other findings, liars were less willing to be photographed, less accurate in identifying the places they planned to visit, and less concrete and more uncertain when describing their intentions.

The current study tested a possible third advantage of undercover interviewing by examining whether they could serve to establish evidence for later interviews. That is, a suspect could be interviewed by an undercover interviewer about an apparently innocuous activity, and later on be interviewed about the period of time that included the interaction with the undercover interviewer by a second interviewer who is aware of the undercover interview but does not reveal this

knowledge to the suspect. Will truth tellers and liars differ in how they report that period of time?

We have reasons to believe that they will, due to liars' (i) unawareness that the undercover interview is an interview, (ii) preference for short term gains, (iii) lack of cognitive flexibility; (iv) tendency to avoid reporting information that they fear may be potentially incriminating, (v) memory deficits, and (vi) lack of imagination in generating stories/alibis. We also predict that fewer liars than truth tellers will mention the undercover interviewer at all. In the current study all participants undertook a mission where they were interviewed covertly in a park by one (undercover) interviewer, and then had a later formal, forensic style interview with a second interviewer. Truth tellers and liars went to the park for different reasons and carried out somewhat different activities, and liars were instructed that if they were asked about their activities to conceal their true reason for visiting the park and to pretend to be there for the same reason as truth tellers.

Liars' Answers Will Show Less Overlap between the Two Interviews

An advantage of suspects being interviewed twice, as in the present experiment, is that investigators may check the overlap in answers between the two interviews. There is a strong belief amongst lay persons and professionals that liars are more inconsistent than truth tellers (Strömwall, Granhag, & Hartwig, 2004; Vrij, Akehurst, & Knight, 2006). This is not always the case. When interviewed twice about an event, liars tend to repeat in the second interview what they have said during the first interview, whereas truth tellers try to reconstruct their stories from their memory during both interviews. Repetition (liars' behaviour) leads to more consistent answers than reconstructing a story (truth tellers' behaviour), as research has demonstrated (Fisher, Vrij, & Leins, in press; Granhag, & Strömwall, 1999; Granhag, Strömwall, & Jonsson, 2003).

In the present study the dominant view that liars are more inconsistent in their responses than truth tellers may well occur, because we expected liars not to employ their 'repeat what I have said before' strategy. Firstly, interviewees may be unaware that the initial undercover interview and

the second formal interview (carried out by two different interviewers) are related to each other. Here, liars may be less likely to repeat what they said in the initial interview in the second, seemingly unrelated interview. Secondly, even when interviewees believe that the two interviews may be related, the repeat strategy may not be their preferred strategy. Liars are typically keen to convince the interviewer and adapt their nonverbal and verbal responses to achieve this goal (DePaulo & Kirkendol, 1989; DePaulo et al., 2003). When answering questions in the second interview, the liars' strategy will be to convince the second interviewer of their honesty and this strategy is likely to overshadow their strategy to repeat what they have said to the first interviewer. In the liar's assessment, it is probably more likely that the second interviewer will make a judgement of their veracity during the second interview only, than that the second interviewer will compare these answers with the answers given in the first interview. In other words, this is a short term-long term trade-off situation and in such situations people often favour what is better at the time regardless of possible long-term consequences (Gray, 1999).

In addition, the manner of questioning differs substantially between the undercover interview (a survey in the park, discussing forthcoming activities) and the second, more traditional interview about someone's recent activities. This variation in interview type means that the questions asked in both interviews, although referring to the same activities, were not identical. Asking different questions makes the repeat strategy ineffective as liars cannot just repeat what they have said before (Leins, Fisher, & Vrij, 2012; Leins, Vrij, Fisher, Mann, & Leal, 2011). We therefore predict that liars' answers will show less overlap between the two interviews than truth tellers' answers (Hypothesis 1).

Liars Will Spontaneously Mention the Undercover Interview Less Often

During formal interviews liars need to decide what information to avoid, deny or admit (Granhag & Hartwig, 2008). It makes little sense for suspects to avoid or deny information they

think the interviewer already knows, but their decision making process is more difficult for pieces of information that they believe the interviewer does not know. Research has shown that in such situations liars have the tendency to withhold information that they believe could be potentially incriminating (Hartwig, Granhag, Strömwall, & Kronkvist, 2006; Hartwig, Granhag, Strömwall, & Vrij, 2005). Such a response is related to the basic forms of human behaviour *avoidance* and *escape* (Carlson, Buskist, & Martin, 2000; Granhag & Hartwig, 2008). In terms of self-regulation this is viewed as a manner of establishing control – by avoiding the aversive event altogether (Granhag & Hartwig, 2008). Liars often view the presence of witnesses as potentially incriminating because witnesses can serve as additional information sources against which investigators can check the veracity of the liars' statement (Granhag & Hartwig, 2008; Nahari, Vrij, & Fisher, 2012, in press). Consistent with this notion, liars included fewer witnesses in their drawings of recalled events than truth tellers (Vrij, Leal et al., 2010; Vrij, Mann, Leal, & Fisher, 2012). Therefore, based on liars' tendency to withhold potentially incriminating information, we predict that liars will spontaneously mention the undercover interview less often than truth tellers in the second interview (Hypothesis 2).

Liars Will be Less Able to Recall the Undercover Interview Questions

Liars' tendency to avoid incriminating information may make them also reluctant to talk about the undercover interview itself, and, consequently, during the formal interview liars may recall fewer questions that were asked during the undercover interview than truth tellers. A second explanation leads to the same outcome. Research has shown that regulation and suppression (which is in fact what liars do) have unintended consequences for cognitive functioning. Amongst other consequences, it leads to degraded memory (Richards, 2004). The most likely explanation for the effect of suppression on memory is that suppressors think more about their behaviour and the need to control it during a conversation than their counterparts (Richards, 2004). Thinking about behaviour and trying to control it is also what liars do (DePaulo & Kirkendol, 1989; DePaulo et al., 2003; Hartwig, Granhag, Strömwall, Doering, 2010; Vrij, Mann, Leal, & Granhag, 2010). Based on

liars' tendency to avoid incriminating information and their possible degraded memory for having to lie during the undercover interview we predict that, compared to truth tellers, liars will be less able to recall the questions that have been asked during the undercover interview when they are explicitly asked about it in the subsequent formal interview (Hypothesis 3).

Liars Will Affirm the Interviewer's Expectations and Will Recall Fewer Unexpected Events

Another consequence of liars' tendency to avoid revealing information that they believe may be potentially incriminating is that they prefer to keep their answers simple (Granhag & Stromwall, 2002). Elaborative answers may contain vital leads for investigators to verify or may result in investigators asking follow-up questions; something that liars often wish to avoid. Liars can also give relatively simple answers for cognitive reasons. It has been suggested that liars lack the imagination to come up with the detail of truth tellers' accounts on the spot (Köhnken, 1996, 2004). Therefore one of the verbal differences that occur between truth tellers and liars is that liars' stories are more stereotypical and contain fewer unexpected elements (Vrij, 2008; Vrij, Mann, Jundi, Hope, & Leal, 2012). Both explanations lead to the same predictions. In response to a leading question (one which could be adequately answered with a simple 'yes' response) in the undercover interview about their activities, we expect liars just to affirm the interviewer's expectations whereas truth tellers may elaborate and also report other activities they engaged in (Hypothesis 4). Based on liars' tendency to produce stereotypical answers we further predict truth tellers to recall more events that they deem to be 'unexpected' in the second interview than liars (Hypothesis 5). We predict truth tellers will spontaneously report (without prompting) more unexpected events than liars, but also when explicitly asked in the second interview whether anything unexpected had happened. To our knowledge this prompting of participants to recall unexpected events has not yet been explored in research.

Collective Interviewing

Liars Will Ask Each Other Fewer Questions

In real life people often commit crimes or reconnaissance missions in groups (Crenshaw, 1990; Soufan, 2011). In the current study, participants carried out their mission in pairs. The participants were also interviewed in pairs (collective interviewing), both in the undercover interview and in the second interview. Interviewing the participants in pairs is entirely natural in the undercover interview as it would appear odd to separate apparent ‘members of the public’ for a seemingly innocuous survey about using the park. Interviewing potential suspects in pairs in the second interview is perhaps more unusual. However, this strategy has advantages. To date, two experiments have been published in which pairs of truth tellers and pairs of liars were interviewed collectively, and they both revealed differences in communication cues between the pairs of truth tellers and pairs of liars (Driskell, Salas, & Driskell, 2012; Vrij, Jundi et al., 2012). When pairs of truth tellers recall a jointly experienced event during an interview, they may communicate substantially with each other in an attempt to collectively recall all the details they know, and to correct each other’s stories. In this respect, Hollingshead (1998) refers to *transaction information search*; the idea that people in interpersonal relationships often have a specialised ‘division of labour’ with respect to encoding, storing, and retrieving information from different domains (Wegner, 1987). Truth tellers, having shared experience of an actual event, may naturally make use of this transactive memory by cuing one another, posing questions to one another, and verbalising connections asking each other questions that could tap into the other’s memory domain. In contrast, liars will not have a joint experience to recall. They may provide their prepared answers to anticipated questions, or if the questions were not anticipated, one person may take the lead and the other person may simply agree with what is said. This is a far less interactive approach than the truth tellers’ approach, and, indeed, in the two collective interviewing experiments to date, the pairs of liars made fewer additions, corrections and interruptions than the pairs of truth tellers (Driskell et

al., 2012; Vrij et al., 2012).

Hollingshead's (1998) transaction information search hypothesis also suggests that pairs of truth tellers will pose each other more questions than pairs of liars. Due to the nature of the interview format, this question has not been addressed in previous research. In the previous experiments the interviewer was the only person asking the questions, whereas the present experiment adapted an interview format based on the timeline technique proposed by Hope, Mullis and Gabbert (2013), which enabled the interviewees to ask each other questions. After the interview the pairs of participants were instructed to collectively prepare a timeline reporting the activities they undertook as well as the duration of the activities. We observed the interaction between the pairs. Based on Hollingshead's (1998) transaction information search we predict that truth tellers will ask each other more questions than liars (Hypothesis 6).

Method

Design and Participants

A total of 96 participants (48 pairs) took part, including one pair that refused to speak to the undercover interviewer. That pair was subsequently dropped from the analyses. From the remaining 94 participants, 29 (31%) were male, and their average age was $M = 22.30$ ($SD = 4.73$) years.

Pairs of friends, partners or colleagues were recruited for the study and were offered a £10 honorarium for participation. We recruited pairs who knew each other because this reflects real life situations: criminals acting together are likely to know each other well (Soufan, 2011). Each pair was randomly allocated to either the truth telling or lying condition. Truth tellers and liars were both instructed to complete tasks A, B and C, as detailed below. Tasks A and C differed between the two conditions and Task B (where the undercover interviewer intervened) was the same for both.

Mission: Truth tellers. Upon arrival, pairs of truth tellers ($N = 24$) were told that their mission was to conduct a 'Visit Victoria Park' campaign. This mission involved collecting material for a promotional flyer encouraging people to visit Victoria Park. The truth telling pairs were instructed to walk together to Victoria Park and take a number of still photographs and videos of a

large fountain (Task A). They were then instructed to take still photographs of animals in an animal enclosure in the park (Task B). For ethical reasons, in both Tasks A and B participants were instructed not to include any footage involving other park users, particularly children.

Whilst at the rabbit section of the animal enclosure during Task B, the pair was approached by an undercover interviewer posing as a member of the city council. The interviewer was blind to the veracity condition of the pair. He asked if they were happy to participate in a survey about park usage. If they consented (all truth tellers did) he proceeded to ask them some questions. Before the survey he casually asked ‘Is it just the rabbits you are taking photos of?’ This question was asked in a conversational style so as not to appear pre-prepared. The survey included questions such as what routes they were taking to enter and exit the park, what they had done before the park visit and what they planned to do after it. There were some ‘filler’ questions included to help with the illusion of it being a park survey, e.g. ‘What is your favourite feature of the park?’ The undercover interviewer wore a surreptitious microphone to record all the participants’ answers. On completing the interview and photographing the animals, the pair walked to a meeting point to meet an experimenter who brought them back to the department via a previously specified route (Task C).

Mission: Liars. When pairs of liars ($N=23$) arrived to take part in the experiment, they were told their mission was to partake in an ‘Animal Rights’ campaign. Their initial task (Task A) was to walk to a nearby department store and photograph the shop window. The rationale for this task was that the department store sells products that are tested on animals and that this would be highlighted in the campaign. Task B for liars was to then walk to Victoria Park and photograph the animals in the animal enclosure, in the same manner as truth tellers. Here, they were approached by the undercover interviewer when they were at the rabbit section as outlined above. Liars then went to a different meeting point to truth tellers to meet an experimenter who escorted them back to the department via a specific route which was entirely different to that which the truth tellers took (Task C). Liars were later instructed to say that they took the truth tellers’ routes to ensure that they indeed would be lying.

Before departing on their mission, the liars were given details of the truth tellers' 'Visit Victoria Park' campaign and were instructed to use this as their cover-up story if anyone happened to speak to them whilst they were on their mission. They were given time to thoroughly look over details of the truth tellers' mission to ensure it was well memorised. Truth tellers were instructed to report their true mission if anyone happened to speak to them whilst they were on their mission.

Truth Tellers and Liars: Post Mission. On returning to the department, all truth telling and lying participants were told that they were suspected of having been involved in an Animal Rights campaign whilst they were out. They were told that their task was to convince the interviewer that they were not involved in an Animal Rights campaign, but instead had been partaking in a 'Visit Victoria Park' campaign. Therefore, truth tellers could honestly report their Visit Victoria Park mission whereas liars needed to convince the interviewer that they had been undertaking the truth tellers' mission described to them at the start of their mission. Participants were not told whether they would be interviewed separately or collectively.

All participants were told that if they did not convince the interviewer they were telling the truth, they would not receive the £10 reward and instead would have to write a detailed statement about their activities during the mission. This was solely to motivate interviewees to be as convincing as possible; in actuality all participants were paid the £10 and none of them had to write a statement regardless of whether the interviewer believed them or not.

All participants were given time to prepare for the interview as a pair. Truth tellers were advised to look over the photographs they had taken and to decide which of them would fit best into the campaign. They were also left with details of their original mission and the routes they had taken to ensure they remembered them clearly. Liars were also asked to check their photographs to determine those best for the 'Visit Victoria Park' campaign. They were given the details of the truth tellers' campaign again to refresh their memory and instructed to study it thoroughly in order to be as convincing as possible.

The experimenter left the room to allow the pair to prepare while unsupervised. After 10

minutes the experimenter returned to ask if they were ready. If not, they were allowed more time until they felt prepared for the interview. One pair of liars and one pair of truth tellers needed more than 10 minutes for their preparation.

After this preparation time, the pairs were split up and individuals were each taken to separate rooms to complete a pre-interview questionnaire asking questions about their preparation, e.g., ‘Did you develop an interview strategy together with your friend?’ (Yes/No) They were also asked to rate on a 7 point Likert scale to what extent they had discussed with their friend what to say during the interview, from 0 (not at all) to 7 (thoroughly).

After completing the questionnaire, pairs of participants were taken to the interview room to be interviewed together. They were informed that they would be audio and video recorded. The interviewer was blind as to the veracity condition of the participants. The interview was conducted in a formal information gathering style. Questions pertained to general, spatial or temporal information, based on a previous study (Vrij et al., 2009). First, interviewees were asked to describe in as much detail as possible what they had done during their mission. After this free narrative, more specific questions were asked focusing on the reasons the pair had gone to the park, what they had done there, the routes they had taken throughout, and what they would be able to see from the fountain and from the animal enclosure. They were also asked if they had spoken to anyone whilst on their mission and if so to describe the exchange. If they admitted to speaking to the undercover interviewer, they were asked what questions he had asked them and what their responses had been. Another question was whether anything unexpected had happened during the task. The interviewer addressed each participant as equally as possible in terms of eye gaze and avoided influencing who would respond to the question.

Pairs were then asked to illustrate physically on a timeline how long each aspect of their task had taken. They were given a paper with a timeline (from 0 to 60 minutes) marked on it, and instructed to indicate what they had done and at what times in whichever manner they preferred (the resultant timelines were largely textual, pictorial or a combination). After the interview, pairs were

split up once more and the individuals were asked to complete a post interview questionnaire. This asked about how motivated they were to appear convincing on a 7-point Likert scale ranging from (1) not at all motivated to (7) extremely motivated.

Finally, at the end of the study we asked 21 pairs of participants (8 pairs of truth tellers and 13 pairs of liars) whether they thought at the time when they left Victoria Park that the undercover interviewer had been part of the study on a 7-point Likert scale ranging from (1) not at all to (7) definitely.

Coding

The undercover and formal interviews were transcribed and coded by one rater who was blind to the veracity status of the pairs. In these codings, the responses of the pairs rather than the individual participants who made up the pair were of interest (thus each interview resulted in one data point). There were eight dependent variables, one derived from the undercover interview and seven for the formal interview.

A second coder coded variables 2, 3, 5 and 8 in all interviews (see below for definitions of these variables), and a random selection of 30% of the interviews for variables 1, 4, 6 and 7. The results indicate that the reliability of all dependent variables was satisfactory. (1) Overlap of content between the undercover and formal interviews was analysed on a 7-point Likert scale ranging from (1) no overlap to (7) almost identical content (intra-class correlation coefficient (ICC) = .78). A middle range rating of 4 would denote approximately 50% identical content and the remainder completely distinct, e.g. 'We came from King Henry building and then went straight to the fountain', compared with 'We came from King Henry building and then went round the park taking photographs of the various parts'. Each question in the formal interview was assessed as to whether participants mentioned the undercover interviewer, and the rater made a binary judgement of yes or no. Based on this we calculated (2) whether or not the undercover interviewer was mentioned in response to the initial free response question ("Tell me in detail what happened during the mission") (Cohen's Kappa .95, inspection of the data showed one disagreement, an error made by one coder)

and (3) the total number of times the undercover interviewer was mentioned in the formal interview after the free recall (intra-class correlation coefficient (ICC) .91, $p = .000$, scores of the coders were averaged). (4) From the formal interview transcripts, the rater also counted the number of questions the participants accurately recalled as having been asked in the covert interview ($ICC = .92$). (5) For the undercover interview, whether the participants said that they were just taking pictures of the rabbits or of rabbits but also other animals (dichotomous variable) was coded (Cohen's Kappa .92). Inspection of the data showed that disagreement occurred on two occasions, due to vague answers by the participants. The two coders discussed these disagreements and reached a final decision. (6) The coder also noted the number of events that the participants reported as being unexpected when they were explicitly asked towards the end of the formal interview whether anything unexpected had happened to them ($ICC = .94$) (7) In addition, the coder noted the number of unexpected events that were spontaneously mentioned in response to the other questions in the formal interview. Examples of unexpected events were 'camera not working', 'difficulty taking pictures of the fountain because there were too many people around', and 'difficulty taking pictures of the animals because they were in cages with bars'. Mentioning the undercover interviewer was not counted as an unexpected event as it was already counted in the 'mentioning the undercover interviewer' dependent variable ($ICC = .86$). (8) The conversation the pair had whilst completing the timeline task was also analysed. The coder counted the total number of questions that they asked each other about the mission. Any questions or comments to the interviewer about how to complete the task were disregarded (ICC was .97, $p = .000$, scores of the coders were averaged).

Results

Manipulation Checks

Participants had an average rating of $M = 5.38$ ($SD = 1.38$) on the 7-point motivation scale which suggests that they were highly motivated to appear convincing. Although truth tellers were motivated ($M = 4.97$, $SD = 1.51$), liars rated themselves as more motivated ($M = 5.80$, $SD = 1.09$), $F(1, 92) = 9.18$, $p = 0.003$, $d = 0.64$.

Regarding the question about whether the participants thought that the undercover interviewer was part of the study, the average mean was $M = 5.05$ ($SD = 2.22$), with liars being somewhat (although not significantly) more certain ($M = 5.46$, $SD = 2.00$) than truth tellers ($M = 4.36$, $SD = 2.47$), $F(1, 19) = 2.26$, $p = 0.142$, $d = .49$. A mean score of 5.05 means that, on average, participants reported to be ‘certain’ that the undercover interviewer was part of the study. Looking at how many participants indicated they were ‘absolutely certain’ that the covert investigator was part of the study (a score of 7 on the Likert scale), only 3 out of 21 pairs (15%) indicated this high degree of certainty. This means the vast majority of pairs (85%) had at least some doubts, even after the formal interview (when this question was asked). This suggests that the covert investigator manipulation was to some extent successful.

Preparation

When asked if they had developed a collaborative interview strategy with their friend, more liars (78%) than truth tellers (38%) claimed they had, $\chi^2(1, N = 94) = 15.97$, $p = .000$, $\Phi = .41$. Liars ($M = 5.17$, $SD = 1.15$) also rated their preparation discussions with each other concerning what to say during the interview as being more thorough than truth tellers ($M = 4.58$, $SD = 1.22$), $F(1, 92) = 5.73$, $p = 0.019$, $d = 0.50$.

Correlations between the Responses to Questions in the Formal Interview

Table 9 presents the Pearson or Spearman correlations between the dependent variables examined in the formal interview. Some correlations are noteworthy. The number of times the undercover interviewer was mentioned in the free recall question correlated highly ($r = 0.77$) with the number of unexpected events spontaneously mentioned during the interview. This cannot be caused by double coding as mentioning the undercover interviewer was not counted as an unexpected event. It perhaps reflects the level of detail provided during the interview. That is, interviewees who provide a lot of detail may be both mentioning the undercover interviewer and reporting many unexpected events. Also, the number of unexpected events reported when prompted correlated highly ($r = 0.59$) with the number of questions the pairs of participants asked each other

during the timeline task, perhaps again reflecting the level of detail provided during the interview.

Apart from these noteworthy correlations, most correlations were low which indicates that the set of dependent variables measured a range of responses from the interviewees.

Table 9. Correlations between the Dependent Variables Measured in the Formal Interview for all participants

	1 Undercover interviewer mentioned in free recall	2 Undercover interviewer mentioned after the free recall	3 Number of undercover interviewer questions correctly recalled	4 Overlap between undercover and field interview	5 Number of unexpected events mentioned when prompted	6 Number of unexpected events spontaneous ly reported	7 Number of questions asked in the timeline exercise
1	1	.19	.22	.06	.25	.77**	.20
2		1	.15	.33*	.44**	.14	.40**
3			1	.03	.14	.40**	.26
4				1	.01	.02	-.07
5					1	.15	.59**
6						1	.11
7							1

* $p < .05$

** $p < .01$

Suspiciousness towards the Undercover Interviewer

With regards to the suspiciousness of the participants towards the undercover interviewer, we carried out five ANOVAs utilising a 2 (Veracity) X 2 (Suspicion about undercover interviewer question asked) design with ‘Is it just the rabbits you are taking pictures of?’, ‘Overlap between undercover and field interview’, ‘Undercover interviewer mentioned in the initial free recall’, ‘Undercover interviewer mentioned after the free recall’ and ‘Number of undercover interviewer recalled’ as dependent variables. None of the main effects for the question about the undercover interviewer (all F values < 3.15 , all d values $> .08$) or interaction effects (all F values < 1.24 , all p values $> .27$) were significant, suggesting that their suspiciousness did not have an impact on these results.

Hypotheses Testing

To test the hypotheses, two sets of analyses were conducted. Chi-square tests were carried out on the two dichotomous variables (taking photographs of the rabbits; and mentioning the

undercover interviewer in the initial free recall question) and ANOVAs on the remaining six variables. The statistical information for the Chi-square tests is reported in the text whereas the statistical information for the univariate tests is reported in Table 10.

We found support for all six hypotheses. Overlap between responses in the undercover and formal interviews was less for liars than for truth tellers (Table 10, Hypothesis 1). When asked in the initial free recall question in the formal interview to give a detailed account of the mission, more pairs of truth tellers (42%) than pairs of liars (9%) mentioned the undercover interviewer, $\chi^2 (1, N = 46) = 7.72, p = 0.005, \Phi = .40$ (Hypothesis 2). Also after the free recall, truth tellers mentioned the undercover interviewer more often than liars did (Table 10, Hypothesis 2).

When asked in the formal interview which questions have been asked in the informal interview, liars recalled marginally fewer correct questions than truth tellers (Table 10, Hypothesis 3). In the undercover interview conducted in the park, in response to the question ‘Is it just the rabbits you’re taking photos of?’ significantly more liars (87%) than truth tellers (48%) said “yes”, $\chi^2 (1, N = 46) = 8.43, p = 0.004, \Phi = .42$ (Hypothesis 4). The remaining truth tellers also mentioned other animals.

In response to the formal interview question ‘Did anything unexpected happen at all during your task?’, truth tellers mentioned more unexpected events than liars. Truth tellers also spontaneously mentioned more unexpected events in the remaining part of the formal interview than liars (Table 10, Hypothesis 5). In the discussion about the timeline task, truth tellers asked each other more questions than liars, consistent with Hypothesis 6 (Table 10).

To examine what proportion of the sample could be accurately categorised based on the variables listed in Table 10, we carried out six separate discriminant analyses for each variable. Consistent with the pattern emerging in the Chi-square analyses reported above, liars were more accurately classified than truth tellers on each occasion. In fact, in this experiment truth tellers were often classified at chance levels. The discriminant functions for interviewer’s questions recalled, $\chi^2(1) = 3.76, \text{Wilk's Lambda} = .92, p = .052$, and spontaneous mentioning of unexpected events,

$\chi^2(1) = 3.75$, Wilk's Lambda = .92, $p = .053$ were not significant, but the discriminant functions for overlap, $\chi^2(1) = 6.64$, Wilk's Lambda = .86, $p = .01$, undercover interviewer mentioned, $\chi^2(1) = 4.86$, Wilk's Lambda = .90, $p = .028$, mentioning of unexpected events after prompting, $\chi^2(1) = 8.18$, Wilk's Lambda = .83, $p = .004$, and timeline, $\chi^2(1) = 10.69$, Wilk's Lambda = .79, $p = .001$ were. The most effective variable veracity classification was the timeline task, on the basis of which 71% of truth tellers and 87% of liars were accurately classified.

Table 10. The Participants' Responses in the Formal Interview as a Function of Veracity

	Truth		Lie		F(1, 45)	<i>p</i>	<i>d</i>	Veracity Classification	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				Truth	Lie
Overlap between undercover and field interview	3.00	1.87	1.73	1.32	7.24	.010	0.79	58%	83%
Undercover interviewer mentioned after free recall	2.22	0.67	1.63	.93	6.17	.017	0.74	46%	78%
No. of undercover interviewer questions recalled	4.42	2.02	3.38	1.49	3.97	.052	0.59	67%	57%
No. of unexpected events reported when prompted	1.65	1.09	0.82	0.78	9.09	.004	0.88	50%	87%
No. of unexpected events reported spontaneously	1.08	1.91	0.26	0.54	3.96	.053	0.67	50%	78%
No of questions asked in the timeline task	10.68	5.97	5.48	4.00	12.22	.001	1.04	71%	87%

Discussion

Undercover Interviewing

Overlap between responses in the undercover and formal interviews was less for liars than for truth tellers (Hypothesis 1). Previous research has found that liars tend to use a 'repeat what I have said before' strategy (Granhag & Strömwall, 1999), which would suggest that there should be

greater overlap with liars than with truth tellers. However, there are a few reasons why we did not expect this to happen in the present experiment. Firstly, a repeat strategy will occur only if the interviewee believes that the two interviews are linked, which was not the case in this experiment. Secondly, even if the interviewees suspected that the interviews were linked, we used different interviewers in both interviews. The results suggest that liars chose to tailor their answers in the second interview to what they believed sounded convincing to the second interviewer - rather than to ensure the answers showed overlap with their answers during the first interview. Thirdly, although the questions referred to the same event in both interviews, they were purposefully phrased differently, and liars may have lacked the cognitive flexibility required to adequately identify the similarities and address both sets of question in the same way.

Our findings and those from Granhag and Strömwall (1999) combined reveals a complex picture regarding the relationship between deception and consistency. There is a strong belief amongst lay persons and professionals that liars are more inconsistent than truth tellers (Strömwall, Granhag, & Hartwig, 2004; Vrij, Akehurst, & Knight, 2006). However, this will only be the case if liars do not execute their ‘repeat what I have said before’ strategy (Granhag & Strömwall, 1999). As demonstrated in the present experiment, interviewers can actively discourage liars from using such a strategy by making the link between interviews less apparent, through changing the format in which the questions were asked. This results in liars making shorter term credibility-based decisions in apparently unrelated interviews. Without specific interventions from the investigator aimed at discouraging liars to use their ‘repeat’ strategy, we expect liars to use this strategy and avoid the inconsistencies that investigators expect them to make.

Truth tellers mentioned the undercover interviewer more than liars (Hypothesis 2). This is interesting as parallel work on alibi preparation has shown that ‘innocents’ report planning to mention potential witnesses for their alibi (Nahari, Vrij & Fisher, 2012). In contrast, liars prefer not to be linked with incriminating evidence – this is termed the ‘avoid or escape’ strategy (Granhag &

Hartwig, 2008). This strategy perhaps accounts for why most liars in the current study (91%) avoided mentioning the undercover interviewer, who could potentially act as a witness to their actions. In fact, photographing the animals at the animal enclosure was part of the truth tellers' mission too. Having been informed of the truth tellers' mission, liars were aware of this and so could have plausibly used the undercover interviewer to provide an alibi. The fact that they did not suggests that the 'avoid or escape' strategy exerted a stronger effect over them, compelling them to distance themselves from the information. Further evidence of the fact that liars distance themselves from potentially incriminating information was that liars were marginally less able to recall the questions asked by the undercover interviewer than truth tellers (Hypothesis 3). This finding could also be the result of degraded memory of the undercover interview (Richards, 2004), due to the fact that liars may have been pre-occupied or distracted with the effort of lying during that interview.

Truth tellers were more likely than liars to report that they took photos of animals other than rabbits (Hypothesis 4); an indication that the liars wanted to keep their answers simple, a preferred strategy amongst liars (Granhag & Stromwall, 2002). Liars may have reasoned that replying that they also took pictures of other animals would have elicited more questions from the interviewer, which could potentially have resulted in them revealing incriminating information. The preference to keep it simple, as well as a lack of imagination, may be the reason why liars reported fewer unexpected events both spontaneously and, as measured in this experiment for the first time, when prompted (Hypothesis 5). The finding that differences emerged between truth tellers and liars in mentioning unexpected events when being prompted to recall such events has important implications. Although it has been found more often that truth tellers report more unexpected information than liars (Vrij, 2005, 2008), a disadvantage of this cue is that truth tellers often do not spontaneously recall unexpected events either. This may in part be caused by their expectations. If conversation partners do not know each other well, which is the case in most formal interview settings, interviewees tend to give short, to the point answers (Fisher, 2010; Fisher, Milne, & Bull, 2011). It could be that truth tellers have experienced unexpected events but choose not to report them because they believe them

to be trivial or irrelevant. Prompting about such information may stimulate truth tellers to report them, and liars could well lack the imagination and cognitive ability to match reporting the same number of unexpected events as truth tellers.

The present experiment demonstrates that undercover interviewing can be used to not only establish evidence but also to identify a potentially deceptive individual via between interview comparisons. In this experiment the second interview was a formal interview. Such an interview is appropriate if investigators believe that they have enough evidence against the suspect to start a formal investigation. In other real life settings conducting a formal interview may be undesirable. In such cases the second interview could also be an undercover interview or another more informal interview setting. Carrying out a second undercover interview may be disadvantageous in that the undercover interviewer cannot ask many and/or detailed questions because this may make the suspect wary. Whether short undercover interviews can yield the same effects as the formal interview employed in the present experiment is an empirical question worth examining.

Collective Interviewing

Truth tellers asked each other more questions than liars during the time line task (Hypothesis 6) which supports Hollingshead's (1998) transaction information search hypothesis. The two collective interviewing experiments published to date (Driskell et al., 2012; Vrij et al., 2012) revealed that truth tellers interact more with each other spontaneously than liars. This experiment revealed that they also do this when prompted. The benefit of prompting is that interviewers take control of the interview setting and in doing so can initiate techniques that *elicit* differences in the transactional information search between truth tellers and liars.

The 'asking each other questions' variable resulted in the correct classification of more truth tellers (71%) and liars (87%) than any other dependent variable in the present experiment. These high percentages indicate a strong effect, but they need to be treated with caution. The correct classifications are based on between-subjects comparisons whereby the score of each individual in the sample is compared with the scores of the other individuals in the sample. However, in such com-

parisons the cut-off point cannot be determined beforehand. That is, we can predict that liars will ask each other fewer questions than truth tellers but cannot predict the maximum number of questions liars will ask. In real life, investigators would need such information to make veracity judgments. A possible solution is the development of within-subject lie detection tools that allow for individual idiosyncrasies whereby the responses in a given situation are compared with the responses in a comparable situation in which the respondent is known to be truthful. A change in responses is more likely to occur in liars than in truth tellers and change scores could then be used to establish veracity. Within-subjects lie detection tools exist; for example the Concealed Information Test polygraph test (Lykken, 1959, 1960), but are more the exception than the rule in deception research.

Future research could examine reasons for the collective interviewing effect beyond the transaction information search hypothesis. For example, since more liars than truth tellers developed a collaborative interview strategy, liars could have had less reason to communicate with each other. To test this hypothesis, collaboration between the pair in preparation of an interview could be monitored in future research and correlated with interactive communication during the interview.

Interviewing suspects individually is standard protocol in formal forensic settings, and there are various reasons for this. Investigators may believe that they will find more inconsistencies in the answers from pairs of liars than pairs of truth tellers (Inbau et al., 2013). They may also believe that they can set up one interviewee against the other if they interview the pair members separately, or they may simply never have considered collective interviewing. Future research could compare the efficacy of individual and collective interviewing for detecting deceit.

Interviewing collectively can be entirely acceptable if such interviews take place in non-traditional investigative settings such as in parks, shopping malls, sport venues, security check points, airports and other border controls. People are often in small groups in such places and separating them can be time consuming, cause unnecessary aggravation and lead to uncooperative interviewees. Investigators may be reluctant to use the collective interviewing technique in such settings but we believe that their reluctance should not be guided by fear that such interviews fail to reveal

cues to deceit. Although the current study examined collective interviewing amongst pairs, the technique is not limited to pairs and could be used with groups of more than two individuals. Future research could examine how efficient collective interviewing is in these situations.

Final Thoughts

The present experiment demonstrated that investigators can *elicit* diagnostic cues to deceit via specific interview protocols. We elicited the cues ‘mentioning unexpected events’, ‘inconsistency’ and the communication cue ‘asking each other questions’. As such, this experiment fits well in the new wave of research on ‘interviewing to detect deception’. The core of this new research paradigm is that the deceptive cues liars display spontaneously are weak and unreliable. Interviewers therefore should have an active role and enhance and elicit such cues via specific interview protocols. See Vrij (in press), Vrij, Granhag and Porter (2010), Vrij and Granhag (2012a, b) and Vrij and Verschuere (in press) for recent reviews.

For many of our findings we have offered several potential explanations, but the extent to which each explanation contributed to the finding is quantitatively immeasurable. This should not be deemed problematic; a finding that can be explained in multiple ways is more likely to be robust, which we consider advantageous. Future studies should seek to measure the relative impact of different factors on the findings obtained in this experiment.

There are some important procedural and methodological factors to consider. Truth tellers and liars undertook different activities, a common feature in deception studies. Although it may create a confound (truth tellers and liars undertake different activities), it is the favourite paradigm in deception research as it reflects real life. In reality outright lies (e.g., total fabrications) are the most common lies people tell (67% of lies are outright lies according to a diary study examining lies told in daily life, DePaulo et al., 1996) and innocent suspects often have undertaken different activities and been involved in distinct circumstances to guilty suspects. As such, the results have robust ecological validity.

When examining undercover interviewing, participants who are sent out on a mission may

well expect something to happen during that mission that is not explicitly detailed in their briefing. To ensure that they stay in their experimental role if approached and questioned (either by an experimenter or an incidental encounter with some other member of the public) it is important to require them to ‘stay in role’, otherwise they may simply respond that they are partaking in an experiment. Sceptics may think that participants will always believe that people who approach them are part of the experiment but evidence suggests that this is not the case. Many participants in Vrij, Mann, Jundi et al. (2012) did not realise that the undercover interviewer was part of the study, and also in this experiment we succeeded in creating some doubt in many participants. Of course, the degree of suspicion is naturally dependent on how convincing the undercover interviewer is. The ‘set-up’ in the current study was realistic to the extent that it is entirely plausible that someone from the City Council might conduct a survey concerning the use of a local public park. Of course, undercover interviews in real life may be easier to conduct because interviewees may not expect them to happen.

Not all pairs were asked about to what extent they believed the park interviewer to be part of the experiment (when they were leaving the park). This is because the first few participants to partake in the study were simply asked in general to what extent they believed that the interviewer was part of the experiment. However as this was asked after the formal interview, we realised that they may have had time to process the circumstances and could now be more suspicious of the undercover interviewer than they were initially. An alternative option, to ask the question after the mission and before the interview, could have made the pairs suspicious that the undercover interviewer was part of the experiment- something we felt important to avoid. We therefore decided with the remaining participants to ask the question after the interview but qualified the point of time when they may or may not have considered him to be part of the experiment (i.e. as they were leaving the park).

Despite the doubt we created in many participants, on average participants indicated that they were ‘certain’ that the undercover interviewer was part of the study. This may make our find-

ings more impressive, because one would think that if liars suspected that the undercover interview was part of the mission, they would be more inclined to mention the undercover interview during the formal interview, or would be more inclined to accurately recall questions from that interview.

The study method complements the PEACE model with its non accusatory, information gathering style. Indeed the PEACE approach involves the discussion of details that later can be used to incriminate a suspect, and so does undercover interviewing to establish evidence. As such, undercover interviewing may in some circumstances become an additional tool in the PEACE box.

In sum, these findings provide further evidence that the undercover interviewing and collective interviewing techniques are promising tools to detect deception. We believe that they have potential to be invaluable in interviewing settings outside formal police interviews, and hope that this article will stimulate thinking and research in this important but neglected area.

Part V: General Discussion

Chapter 8: General Discussion

Summary of Findings

The aim of this thesis was to explore whether covert and collective interviewing can provide effective, observable cues to deceit. Participants were either interviewed covertly by an undercover agent, interviewed in pairs, or a combination of both. Each experiment involved participants conducting a different task, however all had the premise of liars conducting a form of simulated criminal or terrorist activity. When interviewed, either covertly or formally, liars were asked to use the truth tellers' story as their alibi. This ensured that differences observed could be plausibly attributed to veracity, and not to differing story content. Participants were not explicitly told that they would be interviewed covertly prior to it occurring, however they were asked to always stick to their cover story should anyone speak to them.

Throughout this chapter, the terms 'covert' and 'undercover' will be used interchangeably to refer to the manner of interviewing suspects without explicitly informing them that a law enforcement interview is being conducted.

In Experiment 1, participants were covertly interviewed about their plans for an upcoming trip. Interviews were short; involving five questions in total. Participants were either actual tourists about to visit the Isle of Wight, or liars briefed to find a suitable place to plant a decoy device to cause disruption. Findings indicated significant verbal differences in truth tellers' and liars' responses, where liars used more hedges, hesitations and confirmations in their speech than truth tellers. Liars also mentioned less times, less activities, and were less accurate than truth tellers when marking their destination on a map. Liars were less willing to be photographed than truth tellers.

Covert interviewing can be a complex paradigm to introduce into real world settings, as the questioning style should encourage interviewees to talk and avoid raising their suspicion. Trying

to incorporate questions that detect possible criminal intent into a seemingly everyday conversation has the potential of sounding stilted and artificial, thus signalling the interviewer's real intentions. For example, asking people to recall their experienced events in reverse order provides cues to deceit (Vrij, Mann, Fisher, Leal, Milne & Bull, 2008), but this would not feature in a typical everyday conversation. In terms of detecting deceit in intention, asking people to describe imagined events in sensory detail (i.e. including sights and smells) provides cues to veracity (Warmelink, Vrij, Mann, Jundi, & Granhag, 2012), but again may seem awkward in an everyday conversation. In our experiment not only was the covert interview effective in eliciting cues to deceit, but 46% of liars did not realise that the undercover interview was part of the experiment. This is especially impressive when considering that during their instructions they were informed as to how to act 'if anyone happened to approach them', which may have therefore primed them to expect to be intercepted.

The findings from Experiment 1 would be even more applicable in real world settings if it transpired that the differences elicited could be observable without formal coding and analysis. This is important as the ultimate aim of a covert investigator is to assess whether the interviewee poses grounds for suspicion – and if so immediate action may be warranted depending on the severity of the situation. So in Experiment 2, a lie detection study was carried out in order to determine whether these differences could be identified by lay observers. Each observer was given transcripts of 8 interviews in Experiment 1, and judged whether they seemed to be from a truthful or deceptive interviewee. So each transcript was assessed more than once. Observers could correctly determine veracity significantly better than chance level. They correctly identified truthful interviewees at a rate of 64.02%, which was above chance. Deceptive interviewees were correctly identified at a rate of 56.82% which was also above chance. In addition participants rated 53.60% of all responses as truthful, which differed significantly from chance. The latter finding indicates a truth bias. However law enforcement officers may be less likely than lay observers to exhibit a truth bias. Indeed Meissner and Kassin (2002) demonstrated that an effect on response bias such that

training and prior experience of investigators increased the likelihood of delivering a verdict of 'deceit' as opposed to 'truth.' This is termed the 'investigator bias'. This could, however be influenced by the nationality of the investigator. When exploring the behaviour of UK investigators for example, no such bias was identified (Mann, Vrij, & Bull, 2004, 2006; Vrij, Mann, Robbins, & Robinson, 2006). A possible explanation for this difference is the importance given to interpreting nonverbal behaviour. In the US more emphasis is given to spot non verbal cues to deceit than in the UK (Vrij, 2008). Since the non verbal cues officers pay attention to are all cues to deceit rather than a mixture of cues to deceit or truthfulness, it means that the presence of such cues is interpreted as a sign of deceit whereas the absence of such cues is not necessarily seen as a sign of truthfulness. A lie bias is likely to be the result.

A key advantage of Experiment 1 was the length of the undercover interview. In real world settings, investigators will have limited time for conversation before they will need to make a judgement, as lengthy interviews could arouse suspicion or simply result in the interviewees leaving. Experiment 3 tested another style of short undercover interview. Participants were despatched on a mission to take photographs, and when they completed this were approached by a mime artist who asked them if they had photographed him and if he could see the photos. Truth tellers were more likely than liars to admit to having photographed him, and to allow him to see the photos. When analysing the photos, truth tellers' photographs were more open, appealing, included more people, and central than liars' photographs. Suspicious features were more prominent in liars' photos and liars mentioned them more frequently. Here, the contents of photographs can be used as evidence to inform the interview.

Proceeding to test the collective interviewing manipulation in Experiment 4a, suspects were interviewed in pairs about their recent activities. Truth tellers had lunch in a nearby restaurant, whereas liars were asked to 'steal' money from a purse but claim that they were having lunch at the time. Their eye gaze patterns were analysed and they were asked about the strategies they employed. Results showed that liars looked at the interviewer more, and exhibited less gaze

aversion than truth tellers. More liars than truth tellers developed a strategy prior to the interview. Truth tellers stated they did not prepare a strategy as they found it unnecessary, or they used a 'tell them how it was' strategy. This is an example of the illusion of transparency (Gilovich, Satsky & Medvic, 1998) in which truth tellers believe their innocence will be apparent. This effect is replicated in later studies as described below. Liars however used strategies to be convincing and to maintain eye contact with the interviewer.

The verbal behaviour of suspects being collectively interviewed in Experiment 4b was analysed. Truth tellers interrupted each other more, corrected each other more, and added more information to each other's accounts than liars. This demonstrates how pairs of truth tellers collectively recall information by communicating with one another. In the case of liars however, there is little or no collective experience that they wish to convey together to the interviewer, and thus these patterns of communication (interrupting and correcting each other and adding more to each other's accounts) is not observed.

In Experiment 5, a combination study involving undercover and collective interviewing was employed. Participants undertook a study in pairs, and were interviewed covertly and formally in pairs. Results showed that liars had less overlap than truth tellers when their responses in the covert interview were compared to their responses in the formal interview. Liars were also less likely than truth tellers to mention the undercover interviewer in the formal interview, even though the period at which he was encountered was part of the truth tellers' story (and therefore a plausible part of the liars' alibi) as well. This complements Experiment 3, in which evidence is established to later inform an interview.

The strategies of participants in Experiment 3 and Experiment 5 were then analysed. In Experiment 3, no differences between veracity with regard to strategies were found. We compared this to Experiments 4a and 5, in which differences between strategies were identified. A key discrepancy was the interview format, as in Experiment 3 participants were solely asked about the photographs they had taken, whereas in Experiments 4a and 5 they were questioned about a range

of activities they had participated in e.g. routes travelled and people spoken to. Another unique factor of Experiment 3 was that they were only asked about their strategies after the interview had taken place, whereas in Experiments 4a and 5 participants were also given pre interview questionnaires which asked them to detail their strategies. It is possible that questioning participants about their strategies prior to an interview encourages them to think about strategies, which then affects the strategies devised and used during the interview.

Analysis of Experiment 5 demonstrated significant differences in the individual and collaborative strategies formed by liars and truth tellers. Again truth tellers stated they would just 'tell the truth', replicating the findings from Experiment 4a. Liars however stated they would focus on working together to answer the questions.

The thesis demonstrates continued support for truth tellers exhibiting the Illusion of Transparency, which is the tendency to assume their innocence will be apparent to observers. This is manifested through less truth tellers than liars forming a strategy (as found in Experiment 4a and 5), and in more truth tellers and liars using a strategy to 'just tell the truth', which was also apparent in Experiments 4a and 5.

Continued support is also found for the tendency of liars to employ an 'avoid or escape' strategy (Granhag & Hartwig, 2008). This involves them distancing themselves from anything they deem to be potentially incriminating. It is demonstrated in Experiment 5 in which liars avoided mentioning the undercover interview even though he formed part of their alibi, and in Experiment 5 in which liars were more reluctant than truth tellers to allow the mime artist to see their photographs.

According to Francis (2012), in psychology, experimental replication is crucial for establishing validity in empirical findings. We suggest that the replications we have found within this thesis demonstrate that our replicated results are robust. It also suggests that the findings are independent of the factors that pertained to each individual experiment e.g. demographic of participants and the tasks they were asked to do. If the findings were dependent on these factors, later studies in which these criteria were modified would not have generated the replications

observed.

Real world applications

With counter terrorism measures being of paramount importance in current law enforcement, both paradigms tested i.e. undercover and collective interviewing are particularly pertinent. Under Section 44 of the terrorism act, people and vehicles can be stopped and searched by authorities 'where a senior police officer who reasonably suspects an act of terrorism will take place authorises its use in circumstances where the powers are considered necessary' (Terrorism Act, 2000). When stopping a vehicle, the passengers are asked questions first to determine whether they are suspicious or not. In these situations there may be one interviewer and several suspects, and so collective interviewing techniques will be appropriate. Employing the collective interviewing techniques described can effectively elicit cues to deceit. This is not only appropriate in counter terrorist measures, but also in situations such as border control, or when stopped by traffic officials for erratic driving. Recent research has also found cues to deceit when interviewing couples about the legitimacy of their relationship, which could be effective in identifying sham marriages. Analysis was conducted to determine whether the pair engaged in behaviours such as turn taking when responding to questions. When forced to turn-take, truth telling pairs were more able to continue on from each other's accounts, whereas lying pairs were more likely to repeat what their partner said before continuing (Vernham, Vrij, Mann, Leal & Hillman, under review). This complements the findings from Experiment 4b in which truth tellers added more information to each other's accounts than liars.

Our collective interviewing results suggest that indeed interviewing more than one suspect at once can effectively elicit cues to deceit. These are important findings as current police practice dictates that suspects be separated immediately when being brought in for questioning. However interactions before the suspects have been separated can be analysed. For example prior to arrest if suspects are approached as a group, their intra-communication can be examined. This could

be the deciding factor for investigators who are unsure as to whether to bring a pair or group in for questioning or not.

The key advantage of using techniques of undercover and collective interviewing is that they can be used to determine a person's intentions, i.e. before any illegal activity has actually taken place. Prior to the 9/11 attacks in 2001, research on criminal and terrorist intentions was scarce, possibly because researchers underestimated its importance. It has since been investigated further, e.g. Warmelink, Vrij, Mann, Jundi, & Granhag (2012) found that liars gave less details than truth tellers in response to unexpected questions about their upcoming trip. As policing duties tend to be required around reacting to crimes that have been committed (Homel & Clark, 1994), police suspect interviews are often about past activities. Areas in which more of a preventative approach is used include counter terrorism, counter espionage and border control. Intelligence agencies and defence centres may therefore benefit from using the interviewing techniques identified. Police may benefit from looking at criminal intentions too, to prevent crimes before they happen. Granhag (2010) presented a case for law enforcement officers to incorporate detecting deceptive intentions into their work.

Undercover and collective interviewing could be appropriate in military situations, in which the agents are involved in the interviewing of subjects, the questioning of prisoners, and the vetting of those who may provide information of operational or intelligence value. Collective interviewing may be of use in situations where there are large numbers of people to interview. Undercover interviewing may take place in the field, particularly in areas of high threat where the interviewer needs to ascertain whether the person is friendly or hostile.

Limitations

A limitation of the thesis is the stakes at hand in the experiments. High-stakes situations involve large positive consequences of being believed or large negative consequences of not being believed (Mann & Vrij, 2008). High stakes lies can be accompanied by powerful emotions (ten

Brinke & Porter, 2011), which may not have been triggered during the studies in this thesis.

Throughout these studies, the most a participant had to lose was a £10 cash reward. Whilst we hope that in a participant pool largely consisting of students that this may have instilled a degree of motivation, we acknowledge that in a police interview the stakes may be as grievous as a lifetime in prison, or, in some countries' jurisdictions, the death penalty. These levels of negative stakes cannot be ethically instilled in a laboratory setting, which may account for why to date there is a scarcity of published high stakes deception research (Porter, 2010). Studies of high-stakes liars, where the behaviour of suspects of murder, rape and arson in police interviews have been examined, have revealed, however, that their behaviour is similar to that of low-stakes liars (Mann, Vrij, & Bull, 2002; Mann & Vrij, 2008). For example, in lab based studies liars typically display fewer movements than truth tellers (Vrij, 2004), and so did these suspects in their police interviews. Vrij & Granhag (2012) argue that high stakes situations will affect both truth tellers and liars to a heightened degree, as they all have more to lose in these circumstances. So the magnitude of differences between truth tellers and liars in high stakes situations may in fact be comparable to that in low stakes situations.

Another factor to consider is the opportunity samples through which we recruited participants for our studies. Advertising on posters and internal university websites resulted in samples that consisted largely of staff and students at the university. Whether this population has a mindset that is representative of that of terrorists is questionable. According to Russell and Miller (1977), terrorists are likely to be between the ages of 22 and 25 years old, single, left wing males, from middle-to upper-class with some university education backgrounds. When looking at the population demographics from our experiments, a large proportion of our participants are male and between the ages of 22 and 25, and all have some university education. Future research could ask questions to determine their political views, class and relationship status. One may argue that profiles of terrorists could have changed since 1977, however the 2009 attempt to detonate a bomb on a US plane was carried out by a 23 year old male student from a UK university. Vrij (2004)

states that the average university student differs from the average suspect in a police interview in that students are on average more intelligent than suspects in police interviews (Gudjonsson, 2003) and this difference might affect how they lie (Ekman & Frank, 1993). But although the typical police suspect may be less intelligent than the average student, the typical terrorist may not be as the crimes they plan to commit are generally more grievous, more complex and of a larger scale. In a study comparing the demographics of male and female terrorists, the majority of female terrorists were found to be less than 35 years old, employed, educated to at least secondary level, and rarely involved in criminality (Jacques & Taylor, 2013). Many of the students used in our experiments share these traits.

Another possibility that may need to be accounted for is that in real life, the people being interviewed may themselves be spies or experienced conmen, who may have had the experience of legal interviews before. Former FBI agent Navarro (2012) states that interviewing trained intelligence officers is very different from interviewing university students, as students typically have not had to live their lives by lying, and so have not mastered deceit in the same manner as conmen. However research conducted using military personnel and police as participants resulted in findings similar to those generated when using students, suggesting that they are not necessarily better or different liars to students (Vrij, Leal, Mann & Fisher, 2012; Vrij, Leal, Mann & Granhag, 2011; Vrij, Leal, Mann, Warmelink, Granhag & Fisher, 2010).

Limitations of Collective Interviewing

A key consideration when interviewing suspects collectively, is that of memory distortion or conformity. Research has demonstrated that witnesses who discuss an event with others often integrate misinformation from the discussion into their memory of the event, and this is particularly pronounced with discussions with co-witnesses (Gabbert, Memon & Allan, 2003; Paterson, Kemp & Ng, 2011). A real life example of this occurred when a Swedish foreign minister was murdered. Immediately after the crime had been committed, witnesses were placed in a room together to await interview. They discussed the scene with each other whilst in the room. When

leaving the room, the descriptions the witnesses gave about the perpetrator were influenced by each other. The perpetrator was caught on camera and did not match the descriptions that the eyewitnesses provided (Gabbert, Wright, Memon, Skagerberg & Jamieson, 2012). Misinformed, or false memories may be of an even greater concern to law enforcement officials than outright lies, as people often believe their false memories are true (Laney & Loftus, 2008). In these instances people do not display the verbal and non verbal cues that liars are susceptible to (von Hippel & Trivers, 2011) as they are convinced that they themselves are telling the truth. So if memory distortion was occurring within our collective interviews, it would be virtually undetectable. Functional Magnetic Resonance Imaging (fMRI) has been suggested as a method of detecting false memories, as the medial temporal lobes of the brain show more activity when someone is recollecting a true memory, whereas the frontoparietal region shows more activity with the recollection of a false memory (Kim & Cabeza, 2007). In addition, research has demonstrated an association between speaking order and memory conformity, in that people who speak first in a discussion are misled less often than people who do not (Hewitt, Kane & Garry, 2013). Further research into memory conformity amongst collective interviewees may be required, to determine if their accounts become less accurate than if they were interviewed individually. Memory conformity may be more pronounced in truth tellers than in liars, as liars are generating a lie rather than recalling an episodic event that will be susceptible to memory distortion.

In Experiment 5, a common strategy for both truth tellers and liars was to let one person do the talking and lead the conversation. In these instances it is likely that the person nominated to speak was the more dominant in status – however this could be empirically investigated in future research to confirm. If the dominant person does indeed talk more than the other, this could perhaps make lying easier for the pair as the dominant person can then answer the more difficult questions, and the subordinate can simply agree. Interviewers can prevent this by indicating who will answer which question. They could also use 'forced turn taking', whereby the interviewer dictates which pair member begins answering the question, and then enforces a swapping system whereby the

interviewees take turns to add to the answer. This will mean each member talks, regardless of status, and the content of their speech can be examined. Recent studies have begun to explore the method of turn taking, though so far equal status amongst pair members has been assumed (Vernham, Vrij, Mann, Leal & Hillman, under review).

When interviewing groups, some members may be innocent whereas others may indeed warrant further investigation. In this thesis groups were either truth tellers or liars, but when interviewing in real world settings one would need to be aware that the situation will not always be that clear cut. The degree of guilt, or indeed guilty knowledge, may be on a scale with some group members knowing more than others. It may be worth exploring empirically how groups react when some members are guilty but others are not, and how reactions differ when the innocent members are or are not aware that some are guilty.

Limitations of Covert Interviewing

In our initial covert interviewing experiment, liars and truth tellers had different agendas with regards to how they had (or had not) been told to behave. In the ‘Can I take your Picture’ (Experiment 1) study for example, truth tellers were actually tourists whereas liars were primed participants. However we argue that this paradigm in itself is completely representative of real life. Through this method we attained accurate interviews from innocent people travelling to the Isle of Wight for tourism, and from people who were waiting in the terminal with a more sinister intent. An undercover interviewer approaching tourists would be aiming to distinguish between these two types of people, and our proposed method was effective in doing just that (as demonstrated by the consequent lie detection experiment).

A central requirement of this thesis was to identify cues to deceit that could be readily recognised by lay observers, as this would avoid the need to train people specifically to detect deception. Unfortunately this does not guarantee that all law enforcement officers will have the ability to detect these cues to classify veracity at a rate that can be used in real life. Although in our

lie detection study (Experiment 2) people could correctly determine veracity significantly above chance level, it was still far from a 100% accuracy rate. Maybe using law enforcement officers as participants will increase the rate, however a plethora of research states that they usually perform no better than lay observers (e.g. Aamodt & Custer, 2006; Bond & DePaulo, 2006, Vrij, 2004).

Another point to consider is that if truth tellers and liars are asked to do different activities, the differences that emerge between them may be caused by the different activities they do rather than by their veracity condition. But it is questionable to what extent 'activity' will elicit specific cues. Firstly they do not describe different activities, as liars are asked to use truth tellers' stories as their alibi, and cues to veracity are derived from these accounts. Secondly, differences between truth tellers and liars can be predicted based on theory, and those theories surpass activities. For example, Granhag & Hartwig (2008) demonstrate how liars display the 'avoid and escape' strategy to distance themselves from anything they deem to be potentially incriminating. This theory was supported by findings in Experiment 1, where liars were more reluctant than truth tellers to agree to have their photograph taken. Further support was found in Experiment 3 in which they were more reluctant to show their pictures to the mime artist. In addition in Experiment 5, liars were less likely than truth tellers to mention the undercover interviewer as a witness, even though it formed part of an 'innocent' alibi story. Thus limitations that are steeped solely in the activity itself seem refutable.

A potentially more concerning limitation is that of suspects recognising that the covert interviewer is in fact a law enforcement officer. If this were to happen, they may in fact report the same events to the undercover interviewer as to a subsequent formal interview. This may not then result in the inconsistency observed. It would be fundamental to train covert officers in the art of being inconspicuous and ensuring their true intent remains undetected. For example they should be able to interact effectively and convincingly with a variety of people in numerous situations, and to be vigilant as to cues that may suggest the interviewee is wary of them. Indeed if they are detected, protocol would need to be instilled to limit the damage and ensure the suspect does not react in a

dangerous manner (such as assaulting the undercover investigator). In these instances the short nature of the collective interviews is crucial, as investigators may be required to make a very quick decision as to whether the suspect warrants further investigation or not. With regards to recording interviews, if the interviewee suspects that the interviewer might be secretly recording and asks them outright, the interviewer may be compelled to say no to protect themselves. However in this instance the interviewer can legally be held to have 'induced' the person to continue, in the belief there will be no record of the conversation. British lawyers would be reluctant to agree to the use of the material. Arguably of even more concern would be if a suspect realises he is being investigated, yet does not reveal this. Whether this realisation affects how the suspect lies may be worth researching empirically.

As with the collective interviewing, we suggest that covert interviewing is adopted more widely into police practice in contexts in which it is necessary to determine whether someone has ill intentions e.g. counter terrorism initiatives. This will test whether the paradigm is still effective with real life forensic punishment stakes at hand.

Future Research

Stakes

Exploring stakes may shed further light on how collective and undercover interviewing can be used in real world settings. In a high stakes collective interviewing situation, liars may indeed monitor the interviewer more and each other less, as they focus on their own freedom and are less concerned for their partner. Truth tellers may corroborate more, as their anxiety increases and they rely further on their partner who can witness their innocence. Whereas throughout the thesis support was found for liars 'avoiding and escaping' potential witnesses, truth tellers may derive support from witnesses who can support their claims (Nahari, Vrij & Fisher, 2012). Alternatively, as with a prisoner's dilemma situation in which participants can either cooperate or defect, either truth tellers or liars may decide to focus on proving their own innocence, whilst implicating their partner. This warrants further investigation to determine whether the partner adapts

an offensive or defensive stance, and how this manifests itself in deceptive cues.

Collective Interviewing

When answering truthfully or deceptively in an interview, the respondent essentially makes a decision with regard to how to influence the interview, the impression they wish to convey to the interviewer, and ultimately what they want to be believed to have done. However when doing this in a collective interviewing setting, the decision is made on behalf of the group being interviewed. This may then differ from when individuals make interview decisions on their own. For example in the previously discussed defecting in a prisoner's dilemma situation, individuals will most likely make decisions to benefit only themselves, rather than in the interest of the group. Decision making in groups is indeed part of collective interviewing and could therefore be incorporated into future deception research. A possible starting point to explore is Groupthink - when a group makes impaired decisions because group pressures lead to a deterioration of "mental efficiency, reality testing, and moral judgement" (Janis, 1972, p. 9). Aspects of Groupthink that might be particularly applicable in forensic collective interviewing settings include the illusion of invulnerability, which creates excessive optimism that encourages taking extreme risks. Both truth tellers and liars in this situation may overestimate the likelihood that they will be believed. In addition there may be direct pressure on dissenters, whereby members are under pressure not to express arguments against any of the group's views. Self-censorship could also occur, in which doubts and deviations from the perceived group consensus are not expressed. Although in Experiment 4b of this thesis, truth tellers were comfortable in correcting each other, interrupting each other and adding more information to each other's accounts. It is possible that it will manifest in larger groups, and this warrants further investigation. Indeed investigating collective interviewing of more than two suspects is needed to assess whether the patterns observed in pair interviews are still present. New trends may be identified, as adding a third person to an interview setting (such as an interpreter) can have a negative impact on rapport, which then affects how the interview

transpires (Driskell, Blickensderfer & Salas, 2013). So if varying the numbers of people present in the interview can affect the outcome, law enforcement officers may need to vary their interview protocol depending on the number of suspects present e.g. when approaching a suspicious vehicle, the number of passengers may determine the manner of questioning employed.

Undercover interviewing

Whilst we explored various manipulations of undercover and collective interviewing, the non verbal behaviour of pairs of suspects when interviewed covertly was not assessed. In terms of real life implications this may be of interest in order to provide further cues to ill intentions when approaching suspicious groups. For example eye contact patterns such as deliberate eye contact from liars may be observed, as they were present in formal collective interviews (seen in Experiment 3). Liars also tend to make fewer illustrators (hand and arm movements to supplement speech), and fewer hand and finger movements (non-functional movements of hands and fingers independent of arm movement) which may be due to either content complexity or attempted control (Vrij, 2004).

It may be worthwhile to control for the length of the undercover interview. Whilst all the undercover interviewing techniques employed in the thesis involved short interviews (ten questions or less), in real world applications there may only be a few seconds available to determine whether an individual or group warrants further investigation. Therefore manipulations can be introduced to determine the shortest viable undercover interview that can effectively elicit cues to deceit. Some rapidly observable cues to deceit that we identified in interviews are frequent hedges and confirmations (as observed in Experiment 1), and a lack of gaze aversion, or more deliberate eye contact (as observed in Experiment 4a). These could be observed in interviewees in a short interview, perhaps more readily than other more laboured cues (which may require more words) such as avoiding mentioning of specific times (as observed in Experiment 1) or avoiding mentioning witnesses (as observed in Experiment 5).

Undercover interviewing is not always carried out by people who are unknown to the suspect(s). For example in espionage work, deep cover agents or moles are sometimes dispatched to infiltrate organisations. In these situations there is a great deal of undercover interviewing involved, and it is of paramount importance that the agent acquires the necessary information without arousing suspicion. In some instances, people who report wrongdoing to the authorities (informants) are asked to record conversations with the alleged parties – for example in the case of the pharmaceutical company Amgen being accused of illegal marketing tactics (Pollack & Secret, 2012). These conversations are a form of undercover interviewing, and should be treated as such. Therefore research can be conducted to determine the best way to covertly interview suspects that are known to the interviewer, without alerting them as to their intentions. This may involve training them to integrate information gathering style questions into seemingly mundane conversations, for example as our undercover interviewer in Experiment 1 did. On the surface, all that he engaged in was an apparently innocuous conversation about the interviewee's plans for their trip. Even if the interviewee had known the interviewer, this still may have been a plausible occurrence and not raised suspicion.

Conclusions

This thesis has demonstrated that covert interviewing can successfully elicit cues to deception. A key finding pertaining to undercover interviewing is that liars distance themselves from witnesses or anything they deem to be potentially incriminating, even if this could form part of a plausible cover story. In addition it has shown that collective interviewing of pairs of suspects can elicit verbal and non verbal cues to deceit. A further important finding relating to collective interviewing is that truth tellers are more prepared than liars to correct each other, interrupt each other, and add more information to each other's accounts. Findings were replicated throughout the thesis, suggesting robustness and potential usability in real world settings.

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